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Annual Report

of Waste Generation and Pollution Prevention Progress 1998

U.S. Department of Energy
Pollution Prevention Program

September 1999

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Office of Pollution Prevention (EM-77) Web Site Address: http://www.em.doe.gov/wastemin (select "EM-77 Web site") or http://twilight.saic.com/wastemin/
Waste generation data and pollution prevention accomplishment data are searchable by reporting site and waste type.

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Preface

Department of Energy
Washington, DC 20585

This seventh edition of the *Annual Report of Waste Generation and Pollution Prevention Progress* highlights waste generation, waste reduction, pollution prevention accomplishments, and cost avoidance for the Department of Energy for Calendar Year 1998.

This Administration is committed to establishing environmental excellence at federal facilities and addressing important national priorities, such as global climate change and enhancing energy efficiency. As the Department's Environmental Executive, I have responsibility for ensuring successful implementation of "Greening the Government" Presidential Executive Orders, including Executive Order 13101. This Order focuses on waste prevention, recycling, and federal acquisition of products with recycled content.

I am pleased to report that the Department of Energy's Pollution Prevention Program has completed another successful year minimizing wastes and creating a healthier environment for workers and the public as the Department carries out its many important missions. Since 1996, site teams have implemented over 1,000 pollution prevention/waste reduction projects, cutting DOE's waste generation by an impressive 388,000 cubic meters, while avoiding $404 million in waste management costs to the taxpayers.

DOE sites reported implementing 650 pollution prevention projects in 1998, which resulted in a 35% increase in waste reduction in 1998 compared to 1997, with cost savings/cost avoidance estimated at $159 million, compared to $101 million in 1997. This is an impressive return-on-investment gain, as direct operating costs for DOE's Pollution Prevention Program were $22 million in Fiscal Year 1998. This accomplishment can be attributed to the dedication of the federal and contractor staff throughout the complex who seek out pollution prevention cost savings opportunities. I congratulate these site teams for their outstanding efforts to identify, evaluate, and implement site pollution prevention projects.

One item of concern is worth noting. For the first time since 1994, the Department's recycling volumes fell below what was reported the previous year. While reduced market prices for some recyclable materials may have contributed to reduced recycling volumes, there appears to be a marked reduction in recycling efforts at a number of DOE sites. Given the large amount of wastes generated by the Department's environmental restoration, stabilization, and decommissioning activities, this is a cause for concern. I encourage sites to take an aggressive approach to these recycling activities as well as other related activities to ensure the greatest potential of recyclable material is appropriately processed.

I look forward to reporting additional Pollution Prevention Program successes for 1999.

Dan W. Reicher
Assistant Secretary for Energy Efficiency
and Renewable Energy
Environmental Executive

At A Glance

This seventh Annual Report presents and analyzes DOE Complex-wide waste generation and pollution prevention activities at 45 reporting sites from 1993 through 1998. This section summarizes Calendar Year 1998 Complex-wide waste generation and pollution prevention accomplishments. More detailed information follows this section in the body of the Report.

In May 1996, the Secretary of Energy established a 50 percent Complex-Wide Waste Reduction Goal (relative to the 1993 baseline) for routine operations radioactive, mixed, and hazardous waste generation, to be achieved by December 31, 1999.

DOE has achieved its Complex-Wide Waste Reduction Goals for routine operations based upon a comparison of 1998 waste generation to the 1993 baseline. Excluding sanitary waste, routine operations waste generation decreased 67 percent overall from 1993 to 1998. However, for the first time since 1994, the total amount of materials recycled by the Complex decreased from 109,600 metric tons in 1997 to 92,800 metric tons in 1998. This decrease is attributed to the fact that in 1997, several large "one-time only" recycling projects were conducted throughout the Complex. In order to demonstrate commitment to DOE's Complex-wide recycling goal, it is important for sites to identify all potential large-scale recycling/reuse opportunities.

Calendar Year 1998 DOE Complex-Wide Waste Generation

- In 1998, approximately 455,800 cubic meters of waste from routine operations and cleanup/stabilization activities (refer to Appendix F for definitions) were generated:
  - 357,300 cubic meters of radioactive waste (79 percent)
  - 6,200 cubic meters of mixed waste (one percent)
  - 15,300 metric tons of hazardous waste (three percent)
  - 77,000 metric tons of sanitary waste (17 percent).
- From 1997 to 1998, total waste generated by routine operations and cleanup/stabilization activities decreased by 10 percent.
- From 1993 to 1998, total waste generated by routine operations and cleanup/stabilization activities increased 41 percent due to DOE's aggressive cleanup efforts.
- Excluding sanitary waste and wastewater:
  - Routine operations waste generation decreased 16 percent, and cleanup/stabilization waste generation increased five percent from 1997 to 1998.
  - Cleanup/stabilization waste generation (359,500 cubic meters) was more than 18 times greater than routine operations waste generation (19,300 cubic meters).
  - Transuranic, low-level radioactive, low-level mixed, and hazardous waste were generated primarily by cleanup/stabilization activities.

- Low-level radioactive waste was the largest waste type generated, accounting for approximately 94 percent of the total waste generated.

- The above waste generation excludes 11e(2) byproduct material (soil or other material contaminated by extraction or concentration of uranium or thorium). Two sites reported byproduct material in 1998. The Weldon Spring Site Remedial Action Project reported 215,500 cubic meters of low-level radioactive waste, 1,090 cubic meters of low-level mixed waste, and 19 metric tons of State regulated waste. The Grand Junction Projects Office reported 100 cubic meters of low-level radioactive waste.

Calendar Year 1998 Waste Generation by Operations / Field Office

- The Albuquerque Operations Office generated the largest amount of routine operations waste (21 percent).
- The Ohio Field Office generated the largest amount of cleanup/stabilization waste (78 percent).

Calendar Year 1998 Pollution Prevention Accomplishments

- Excluding wastewater projects:
  - A total of 650 pollution prevention projects were completed by 33 of the 45 reporting sites in 1998, compared to 671 projects completed by 31 of the 36 reporting sites in 1997.
  - Pollution prevention projects resulted in a Complex-wide waste reduction of approximately 148,100 cubic meters, with a reported cost savings/avoidance of approximately $159.4 million.
  - Pollution prevention projects reduced radioactive waste generation by approximately 27,800 cubic meters, low-level mixed by 38,800 cubic meters, hazardous by 18,800 metric tons, and sanitary by 62,800 metric tons.
  - The Albuquerque, Chicago, Oak Ridge, and Richland Operations Offices reported the largest total waste reduction from pollution prevention projects.
  - The Albuquerque, Oak Ridge, Richland, and Savannah River Operations Offices reported the largest total cost savings/avoidance from pollution prevention projects.

Calendar Year 1998 Reported Cost Savings / Avoidance

- In 1998, pollution prevention projects resulted in a total reported cost savings/avoidance of $159.4 million. Forty-six percent of this reported cost savings/avoidance ($72.6 million) resulted from two metals recycling projects conducted at the Los Alamos National Laboratory. If the reported cost savings/avoidance from these two projects are deducted, the total reported cost savings/avoidance for 1998 would be approximately $87 million, which is a decrease of $14 million compared to 1997's total reported cost savings/avoidance of $101 million.

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Chapter 1
Introduction

Chapter One describes the purpose of the *Annual Report of Waste Generation and Pollution Prevention Progress 1998*, summarizes the computerized data base for collection of waste generation and pollution prevention data, and outlines the scope of this Report. This Report reflects the management structure and organization of DOE in Calendar Year 1998, and does not reflect the reorganization of DOE announced by Secretary of Energy Bill Richardson on April 21, 1999.

1.1 Pollution Prevention Program Mission and Goals

For more than 45 years, the primary mission of DOE and its predecessor agencies has been to maintain a secure national defense through nuclear weapons production, which resulted in the generation of radioactive and hazardous wastes across the DOE Complex. As the defense mission of DOE began to change from nuclear weapons production to weapons stewardship and energy research, increased attention was given to waste management and environmental restoration, including the cleanup of previously generated waste and the reduction of new waste at all DOE sites.

In keeping with this new mission, DOE established its Pollution Prevention Program. The mission of the Pollution Prevention Program is to reduce, and where possible, eliminate the generation and release of DOE wastes and pollutants by implementing cost-effective pollution prevention techniques, practices, and policies.

DOE Complex-Wide Waste Reduction Goals were established by the Secretary of Energy in the *Pollution Prevention Program Plan 1996* (DOE/S-0118, May 3, 1996), which serves as the principal cross-cutting guidance to the DOE Complex to fully implement pollution prevention programs within the DOE Complex by December 31, 1999 (Figure 1.1).

Figure 1.1
DOE Complex-Wide Waste Reduction Goals for Achievement by December 31, 1999 (Compared to the 1993 Baseline)

For Routine Operations:

- Reduce radioactive (low-level) waste generation by 50 percent.
- Reduce low-level mixed waste generation by 50 percent.
- Reduce hazardous waste generation by 50 percent.
- Reduce sanitary waste generation by 33 percent.
- Reduce total releases and offsite transfers for treatment and disposal of toxic chemicals by 50 percent.

For All Operations, Including Cleanup / Stabilization Activities:

- Recycle 33 percent of all sanitary waste.

For Affirmative Procurement:

- Increase procurement of Environmental Protection Agency-designated recycled products to 100 percent, except when items are not commercially available competitively at a reasonable price, or do not meet performance standards.

Pollution prevention objectives are also addressed in various federal laws and executive orders, including the Pollution Prevention Act of 1990, the Resource Conservation and Recovery Act, Executive Order 12856, and Executive Order 13101 (*Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition*).

Executive Order 13101, signed by President Clinton on September 14, 1998, requires all federal agencies to increase their effort in waste prevention, recycling, and the purchase

of environmentally preferable products. Executive Order 13101 supersedes Executive Order 12873, *Federal Acquisition, Recycling and Waste Prevention*, and requires federal agencies to set goals for solid waste prevention and recycling for the years 2000, 2005, and 2010. Federal agencies should also incorporate the recycle/reuse of pallets and the collection of toner cartridges for remanufacturing into their recycling programs, set goals to increase the procurement of products made with recovered materials, and increase the use of environmentally preferable products and services (products or services that have a lesser or reduced effect on human health and the environment when compared with competing products/services).

Executive Order 13101 also requires the appointment of an Agency Environmental Executive. In February 1999, Secretary of Energy William B. Richardson designated Dan W. Reicher, Assistant Secretary for Energy Efficiency and Renewable Energy, to continue as DOE's Environmental Executive. Mr. Reicher will continue ongoing efforts across the DOE Complex to prevent the generation of waste, promote the acquisition and use of environmentally preferable products, and report progress annually. The complete text of Executive Order 13101 is available on the Internet at http://www.ofee.gov/eo13101/13101.htm.

DOE has also established a goal for the reduction of waste resulting from cleanup/stabilization activities funded by the Office of Environmental Management. This new goal, which took effect in Fiscal Year 1999, requires a 10 percent annual reduction in waste generation, as determined by projected waste forecasts and implemented pollution prevention projects for the current year.

The Fiscal Year 1998 Performance Agreement between President Clinton and Secretary of Energy Peña stated that future pollution must be prevented by incorporating pollution prevention techniques, including waste minimization and recycling and reuse of materials, into all DOE activities. Success in Fiscal Year 1998 was defined as reducing routine operation waste generation by 40 percent compared to 1993, and by reducing/avoiding the generation of radioactive, mixed, and hazardous wastes by approximately 4,000 cubic meters. DOE exceeded its commitment for waste reduction in Fiscal Year 1998, and expects to exceed the commitments for Fiscal Year 1999.

1.2 Purpose

The *Annual Report of Waste Generation and Pollution Prevention Progress* is used by DOE managers to assess progress and refine pollution prevention program activities to maximize waste reduction. This Report presents DOE Complex-wide pollution prevention accomplishments and profiles waste generation and recycling efforts at the reporting Operations/Field Offices. Waste generation totals by state are also summarized.

In December 1998, DOE reached a settlement with the Natural Resources Defense Council, Inc. (NRDC) to develop, operate, and maintain an Internet data base of information to enable public participation in the cleanup process at DOE sites. Waste generation data presented in the *Annual Report* will be extracted and included in this new data base. The data base is expected to be available on the Internet in early 2000,

and must be maintained for a minimum of five years. More information is available on the Internet at http://www.em.doe.gov/settlement/.

1.3 Computerized Data Base

Waste generation and pollution prevention data submitted by DOE reporting sites (Table 1.1, Figure 1.2) are available on the Internet. Waste generation data are searchable by reporting site, Program Secretarial Office, waste type, and year

Table 1.1
1998 DOE Operations/Field Offices and Reporting Sites

Albuquerque Operations Office

- Grand Junction Projects Office*
- Inhalation Toxicology Laboratory
- Kansas City Plant
- Los Alamos National Laboratory
- Pantex Plant
- Sandia National Laboratories/California
- Sandia National Laboratories/New Mexico
- Waste Isolation Pilot Plant

Chicago Operations Office

- Ames Laboratory*
- Argonne National Laboratory – East (including New Brunswick Laboratory)
- Argonne National Laboratory – West
- Brookhaven National Laboratory
- Environmental Measurements Laboratory*
- Fermi National Accelerator Laboratory
- Princeton Plasma Physics Laboratory

Idaho Operations Office

- Idaho National Engineering and Environmental Laboratory

Nevada Operations Office

- Nevada Test Site (including North Las Vegas Facility)

Oakland Operations Office

- Energy Technology Engineering Center
- Lawrence Berkeley National Laboratory
- Lawrence Livermore National Laboratory
- Stanford Linear Accelerator Center

Oak Ridge Operations Office

- East Tennessee Technology Park
- Oak Ridge Institute for Science and Education*
- Oak Ridge National Laboratory
- Oak Ridge Y-12 Plant
- Office of Scientific and Technical Information*
- Paducah Gaseous Diffusion Plant
- Portsmouth Gaseous Diffusion Plant
- Thomas Jefferson National Accelerator Facility*
- Weldon Spring Site Remedial Action Project

Ohio Field Office

- Battelle Columbus Laboratories
- Fernald Environmental Management Project
- Mound Plant
- RMI Environmental Services
- West Valley Demonstration Project

Richland Operations Office

- Hanford Site
- Pacific Northwest National Laboratory

Rocky Flats Field Office

- Rocky Flats Environmental Technology Site

Savannah River Operations Office

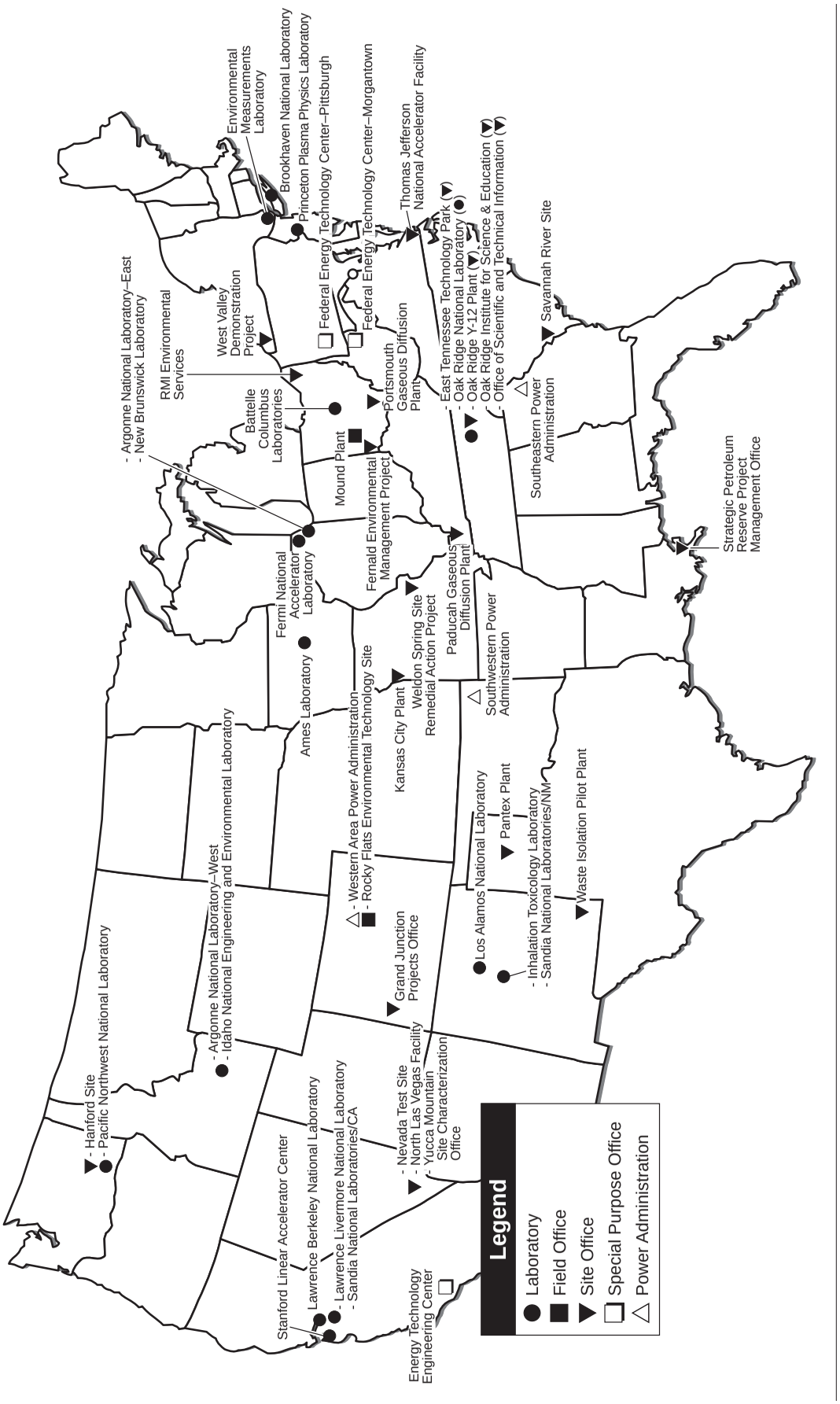
- Savannah River Site

Headquarters Reporting Sites

- Federal Energy Technology Center – Pittsburgh (including Federal Energy Technology Center – Morgantown*)
- Southeastern Power Administration*
- Southwestern Power Administration*
- Strategic Petroleum Reserve Project Management Office*
- Western Area Power Administration
- Yucca Mountain Site Characterization Office*

* Site did not report in 1997 because it was below the reporting threshold.

Figure 1.2
1998 DOE Reporting Sites



(1996, 1997, and 1998). Pollution prevention accomplishment data, including waste reduced and reported cost savings/avoidance, are searchable by pollution prevention activity category, reporting site, waste type, and year (1996, 1997, 1998, and 1999). DOE's Office of Pollution Prevention Web site address is: http://www.em.doe.gov/wastemin (select "EM-77 Web site") or http://twilight.saic.com/wastemin/.

1.4 Scope of the Annual Report

The DOE sites have gathered and reported data on waste generation, waste reduction, reported cost savings/avoidance, quantity of material recycled/reused, pollution prevention accomplishments, and Affirmative Procurement. These Annual Report data are analyzed to assess the following: (1) DOE's overall progress toward achieving its Complex-Wide Waste Reduction Goals, (2) the contribution of each Operations/Field Office to DOE's progress toward achieving these goals, and (3) site pollution prevention achievements (number of projects and corresponding waste reduction and cost savings/avoidance).

It is important to note, that for the purpose of this Report, the following assumptions have been made:

- One cubic meter of waste is equivalent to one metric ton of waste.
- Data are rounded, therefore totals in tables and figures may differ slightly from the sum of the data in the tables and figures.
- Waste generation data are reported by the sites as either routine operations or cleanup/stabilization.
- Transuranic waste totals include mixed transuranic waste.
- Mixed waste totals include low-level mixed and Toxic Substances Control Act mixed waste.
- Hazardous waste totals include Resource Conservation and Recovery Act regulated, State regulated, and Toxic Substances Control Act regulated waste (refer to page F-2 for definitions).

All reporting sites identified in the *Annual Report of Waste Generation and Pollution Prevention Progress 1997* are included in this 1998 Report, except the North Las Vegas Facility (data are combined and reported with Nevada Test Site data), and the New Brunswick Laboratory (data are combined and reported with Argonne National Laboratory – East data). In 1998, the Idaho Chemical Processing Plant (ICPP) was renamed the Idaho Nuclear Technology and Engineering Center (INTEC), and the Office of Energy Research (ER) was renamed the Office of Science (SC).

Affirmative Procurement data (Appendix B) are reported for Fiscal Year 1998, as required by the Office of Management and Budget; all other information in this Report is reported for Calendar Year 1998. Affirmative Procurement data may include amounts reported by additional sites that are not included as reporting sites in this Report. Note that Affirmative Procurement percentages presented in Chapters 2 and 4 of this Report include adjustments for the purchase of items for which a recycled product was not

available at a competitive price or did not meet performance standards. Both adjusted and unadjusted percentages, however, are presented in Appendix B. Accomplishments for the toxics release inventory (TRI) performance measure (*1997 Toxics Release Inventory Public Data Release*, 745-R-98-005, May 1998) are not addressed in this Report because data are not collected as part of this reporting effort.

Data were requested from all previously reporting DOE sites; forty-five sites reported data in 1998. The sites are responsible for the quality of their data, and have provided explanations when their 1998 waste generation data differed from their 1997 data by more than 20 percent.

This Report presents DOE's 1998 waste generation (by the DOE Complex, Operations/Field Offices, and by state) and pollution prevention accomplishments. The Appendices are organized as follows: Appendix A contains data tables and bar charts illustrating Complex-wide pollution prevention accomplishments and waste generation data, Appendix B contains Affirmative Procurement data, Appendix C provides point of contact information, Appendix D contains a list of pollution prevention Web site addresses, Appendix E presents the methodology for calculating pollution prevention project Return-on-Investment, and Appendix F provides a glossary of terms.

Chapter 2

DOE Pollution Prevention Progress

Chapter Two discusses 1998 DOE Complex-wide pollution prevention program performance, summarizes Calendar Year 1998 routine operations and cleanup/stabilization waste generation, illustrates waste generation trends in comparison to the 1993 baseline, and presents waste generation by state.

2.1 DOE Complex-Wide Waste Reduction Goals

The DOE Complex-Wide Waste Reduction Goals call for a 50 percent reduction in routine operations waste generation compared to 1993 baseline levels for major waste types by December 31, 1999, except for sanitary waste, which is to be reduced 33 percent. In addition, a 33 percent recycling goal for all sanitary waste, including waste from cleanup/stabilization activities, must be met by December 31, 1999.

Complex-Wide Calendar Year 1998 Achievements

Number of Pollution Prevention Projects: **650***

Total Waste Reduced: **148,113 cubic meters***

Reported Cost Savings / Avoidance: **$159.4 million***

Category	Performance Measure†	CY 99 Goal
Radioactive Waste	67% reduction	50%
Mixed Waste	64% reduction	50%
Hazardous Waste	83% reduction	50%
Sanitary Waste	65% reduction	33%
Recycling	55% recycled**	33%
Affirmative Procurement	85% purchased	100%

* Excluding wastewater projects.

** This performance measure does not include 24,601 metric tons of recycled soil at the Lawrence Livermore National Laboratory, 624 metric tons of soil at the Kansas City Plant, 397 metric tons of soil at the Lawrence Berkeley National Laboratory, and 53,357 tons of recycled aggregate at the Weldon Spring Site Remedial Action Project.

† Performance measure comparison is from 1993 to 1998, except for recycling and affirmative procurement, for which performance is assessed annually.

DOE has achieved its Complex-Wide Waste Reduction Goals for routine operations based upon a comparison of 1998 waste generation to the 1993 baseline. However, for the first time since 1994, the total amount of materials recycled by the Complex decreased from 109,600 metric tons in 1997 to 92,800 metric tons in 1998. This decrease is attributed to the fact that in 1997, several large "one-time only" recycling projects were conducted throughout the Complex, including the recycling of 13,100 metric tons of coal by the Savannah River Site, 12,300 metric tons of construction and demolition materials by Argonne National Laboratory – East, and 4,800 metric tons of concrete by the Idaho National Engineering and Environmental Laboratory. Figure 2.1 illustrates DOE Complex-wide routine operations waste generation trends by waste type from 1993 through 1998.

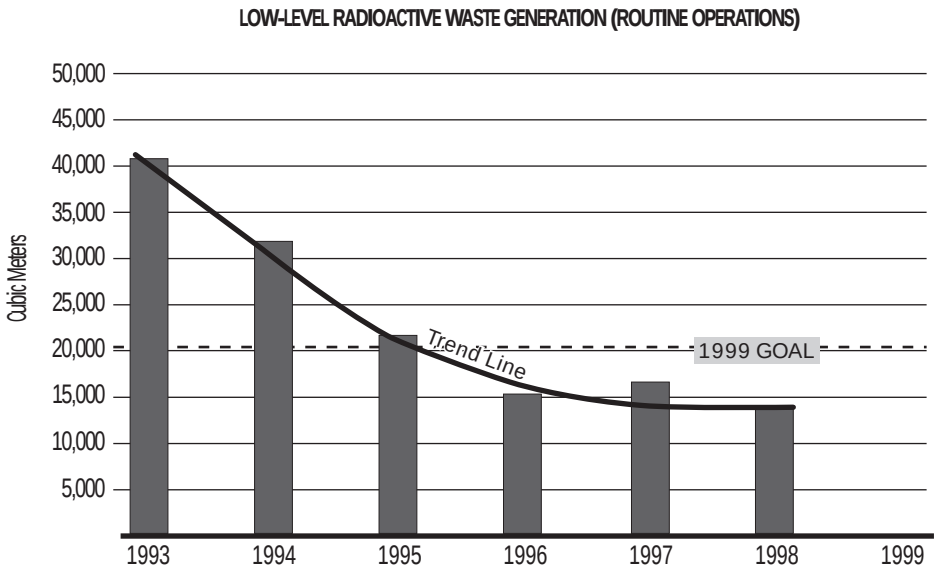
2.2 Pollution Prevention Program Performance (Excluding Wastewater Projects)

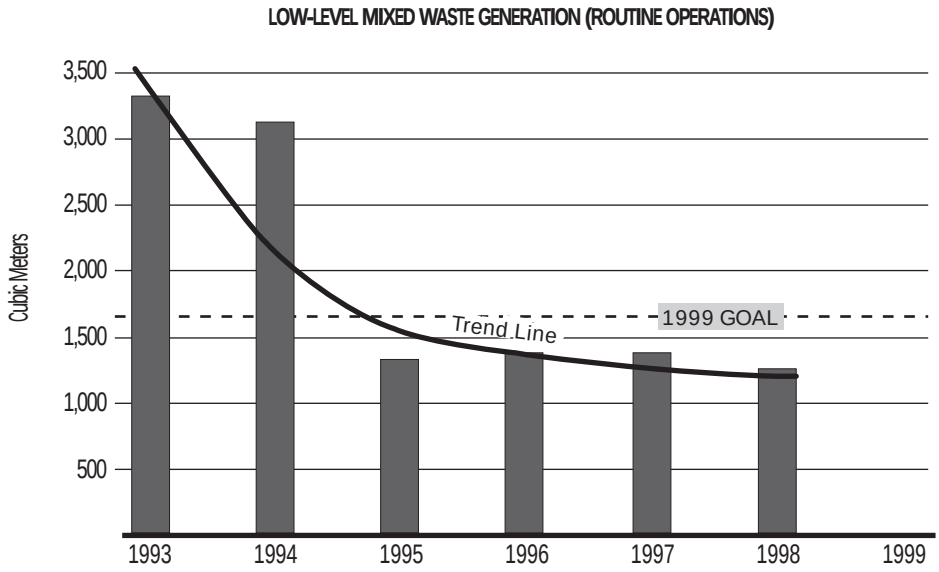
In 1998, 148,100 cubic meters of waste were reduced across the DOE Complex through the implementation of pollution prevention projects, contributing to a reported cost savings/avoidance of approximately $159.4 million (Table 2.1). Of the total waste reduced in 1998, sanitary waste accounted for 42 percent, and resulted in a reported cost savings/avoidance of approximately $15 million. Low-level radioactive waste

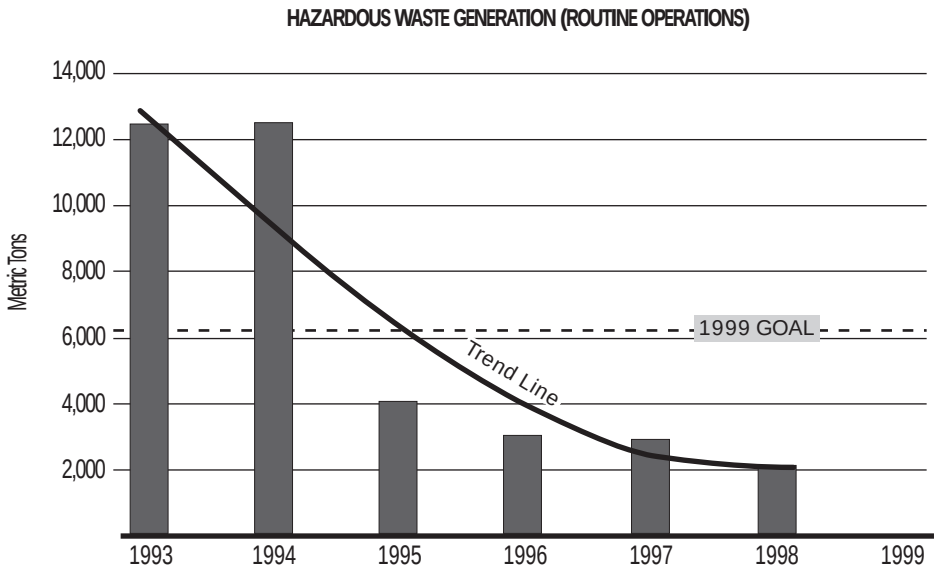
Table 2.1
1998 Complex-Wide Routine Operations and Cleanup / Stabilization Waste Reduction and Reported Cost Savings / Avoidance

Waste Type	Waste Reduction (in Cubic Meters)	Reported Cost Savings / Avoidance
High-Level	0	$ 0
Transuranic	228	$ 6,401,986
Low-Level Radioactive	27,607	$ 30,848,159
Low-Level Mixed	38,757	$ 79,445,340
Hazardous	18,768	$ 27,996,668
Sanitary	62,753	$ 14,670,372
TOTAL	**148,113**	**$ 159,362,525**

Figure 2.1
1993-1998
Complex-Wide Routine Operations Waste Generation Trends by Waste Type







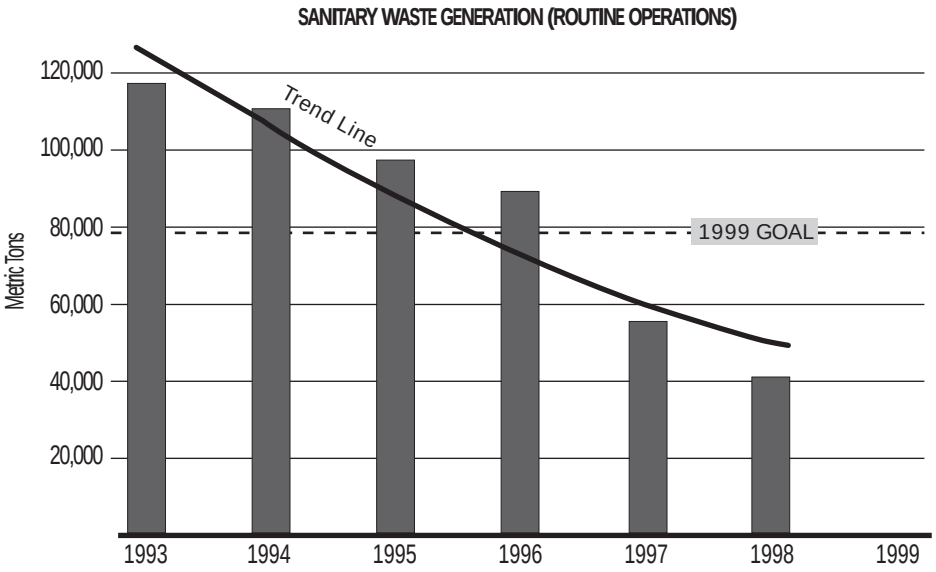


Figure 2.1 (Continued) 1993-1998 Complex-Wide Routine Operations Waste Generation Trends by Waste Type

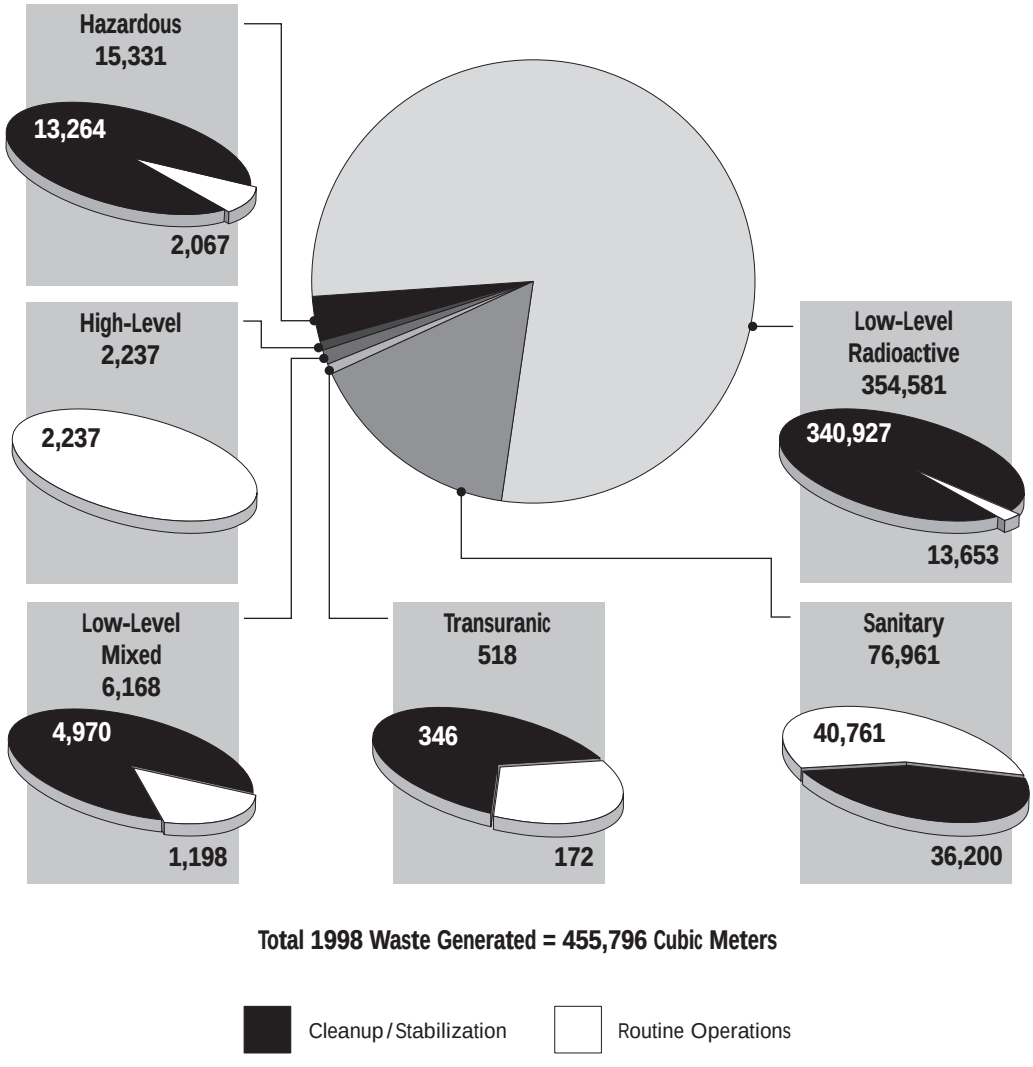
accounted for 19 percent of the total waste reduced in 1998, and resulted in a reported cost savings/avoidance of approximately $31 million. Low-level mixed waste accounted for 26 percent of the total waste reduced, and resulted in a reported cost savings/avoidance of approximately $79 million (Table 2.1).

In 1998, DOE conducted several key pilot programs, and continued several initiatives to instill a pollution prevention ethic throughout the Complex. Chapters 3 and 4 include additional information on Waste Management Re-Engineering, Pollution Prevention and Energy Efficiency in Design at DOE Facilities, the Chiller Phaseout Goal, and the National Metals Recycling Program.

2.3 Waste Generation

In 1998, the DOE Complex generated approximately 455,800 cubic meters of waste (Figure 2.2). Low-level radioactive, hazardous, and sanitary waste constituted 78 percent, three percent, and 17 percent, respectively, of the total waste generated. High-level and transuranic waste accounted for less than one percent, and low-level mixed waste accounted for one percent of the Complex-wide waste generation total.

Figure 2.2
1998 Complex-Wide Waste Generation by Waste Type (in Cubic Meters)



Most of the Complex's waste resulted from cleanup/stabilization activities (87 percent). Most of the cleanup/stabilization waste (74 percent) was low-level radioactive waste generated by the Fernald Environmental Management Project due to safe shutdown activities; the demolition of the Plant 9 Complex and Plant 2/3; the Neutralization, Precipitation, Deactivation, and Stabilization Project; and placement of soil and debris into the newly opened onsite disposal facility.

2.3.1 Waste Resulting from Routine Operations Activities

Waste resulting from routine operations activities consists of waste produced by any type of production operation; analytical and/or research and development laboratory operations; treatment, storage, and disposal operations; work for others; or any other periodic or recurring work that is considered ongoing in nature.

Sanitary waste, the largest waste type generated, accounted for 68 percent of the total 1998 routine waste generated Complex-wide. The generation of routine operations waste decreased from 1993 to 1998 by 67 percent, excluding sanitary waste (Table 2.2).

Table 2.2 1993-1998 Complex-Wide Waste Generation Trends from Routine Operations Activities (in Cubic Meters)

Waste Type	1993	1994	1995	1996	1997	1998
High-Level	1,708	2,071	2,496	2,670	1,994	2,237
Transuranic	709	546	339	302	267	172
Low-Level Radioactive	40,874	31,870	21,896	15,053	16,533	13,653
Low-Level Mixed	3,331	3,133	1,338	1,371	1,373	1,198
Hazardous	12,463	12,520	4,103	3,057	2,880	2,067
Total Excluding Sanitary Waste	*59,085*	*50,140*	*30,172*	*22,453*	*23,047*	*19,328*
Sanitary*	116,795	110,305	96,891	88,939	55,590	40,761
GRAND TOTAL	**172,283**	**160,445**	**127,063**	**111,392**	**78,637**	**60,089**

* In 1993, some sites optionally separated and reported sanitary waste as routine operations or cleanup/stabilization waste. Beginning in 1994, sanitary waste was required to be separated and reported as routine operations or cleanup/stabilization.

2.3.2 Waste Resulting from Cleanup / Stabilization Activities

Waste resulting from cleanup/stabilization activities, including primary and secondary waste, is generated by the environmental restoration of contaminated media (e.g., soil, groundwater, surface water, sediments); stabilization of nuclear and non-nuclear (chemical) materials; and deactivation and decommissioning of facilities. A new goal for reducing waste resulting from cleanup/stabilization activities funded by the Office of Environmental Management was established by DOE in 1999. This goal requires a 10 percent annual reduction in cleanup/stabilization waste through the application of pollution prevention, recycling, and waste minimization practices and techniques, beginning in Fiscal Year 1999.

In 1998, the 45 DOE reporting sites generated approximately 395,700 cubic meters of waste from cleanup/stabilization activities, including sanitary waste (Table 2.3). This represents 87 percent of the total DOE waste generated Complex-wide. Waste generated from cleanup/stabilization activities increased 188 percent from 1993 to 1998, excluding sanitary waste.

From 1997 to 1998, transuranic waste resulting from cleanup/stabilization activities increased by approximately 191 percent, mainly due to increased decontamination and decommissioning activities at the plutonium processing buildings at the Rocky Flats Environmental Technology Site.

Table 2.3 1993-1998 Complex-Wide Waste Generation Trends from Cleanup / Stabilization Activities (in Cubic Meters)

Waste Type	1993	1994	1995	1996	1997	1998
High-Level	0	0	0	0	0	0
Transuranic	458	214	156	202	119	346
Low-Level Radioactive	88,161**	44,217	86,825	64,971§	326,574§	340,927§
Low-Level Mixed	4,533**	14,039	4,936	2,133	2,195	4,970§
Hazardous	31,675	8,900	22,679	29,901	12,747	13,264§
Total Excluding Sanitary Waste	*124,827*	*67,370*	*114,596*	*97,207*	*341,635*	*359,507*
Sanitary*	26,222	16,010	103,027	74,982	83,481	36,200
GRAND TOTAL	**151,049**	**83,380**	**217,623**	**172,189**	**425,116**	**395,708**

* In 1993, some sites optionally separated and reported sanitary waste as routine operations or cleanup/stabilization waste. Beginning in 1994, sanitary waste was required to be separated and reported as routine operations or cleanup/stabilization waste.

** Includes 11e(2) byproduct material (soil or other material contaminated by extraction or concentration of uranium or thorium) at the Weldon Spring Site Remedial Action Project.

§ Excludes 11e(2) byproduct material. Two sites reported 11e(2) byproduct material in 1998. The Weldon Spring Site Remedial Action Project reported 215,500 cubic meters of low-level radioactive waste, 1,090 cubic meters of low-level mixed waste, and 19 metric tons of State regulated waste. The Grand Junction Projects Office reported 100 cubic meters of low-level radioactive waste.

Low-level mixed waste generated from cleanup/stabilization activities increased by approximately 126 percent from 1997 to 1998. Most sites reporting cleanup/stabilization waste generation of low-level mixed waste in 1997 reported an increase in 1998 due to accelerated cleanup activities. The largest increases were reported by the East Tennessee Technology Park and Idaho National Engineering and Environmental Laboratory. The East Tennessee Technology Park's increase was due to two new cleanup activities conducted in 1998: the Group I Building Demolition Project, and the removal of sediment in the K-1420 sumps. The Idaho National Engineering and Environmental Laboratory's increase was due to cleanup activities in several areas, including the Auxiliary Reactor Area, the Central Facility Area, the Test Reactor Area, and the Test Area North.

2.3.3 Waste Generation by State

Table 2.4 presents the total 1998 routine operations and cleanup/stabilization waste generation by waste type for the 24 states where DOE reporting sites are located.

The largest volume of waste, including routine operations and cleanup/stabilization, was generated in the state of Ohio, which accounted for approximately 68 percent of the DOE Complex-wide total in 1998. Most of this waste (94 percent) was cleanup/stabilization waste generated by the Fernald Environmental Management Project due to safe shutdown activities; the demolition of the Plant 9 Complex and Plant 2/3; the Neutralization, Precipitation, Deactivation, and Stabilization Project; and placement of soil and debris into the newly opened onsite disposal facility.

The largest volumes of routine operations waste were generated in the states of South Carolina and Tennessee, which accounted for approximately 20 and 18 percent,

respectively, of the DOE Complex-wide routine operations waste generation total in 1998. All of the routine operations waste generated in South Carolina was generated by the Savannah River Site due to various activities, including the stabilization of nuclear materials in the F and H Processing facilities, the vitrification of high-level waste in the Defense Waste Processing Facility, management of the High-Level Waste Storage Tanks, shipment of transuranic waste to the Waste Isolation Pilot Plant, and the operation of waste treatment facilities, spent nuclear fuel receiving and storage facilities, and laboratories. Approximately 85 percent of the routine operations waste generated in Tennessee was generated by the Oak Ridge Y-12 Plant due to consolidation of operations and performance of current operational activities, including the resumption of enriched uranium operations.

Table 2.4
1998 DOE Waste Generation by State and Waste Type (in Cubic Meters)

	High-Level			Transuranic			Low-Level Radioactive		
State	Routine	Cleanup / Stabilization	TOTAL	Routine	Cleanup / Stabilization	TOTAL	Routine	Cleanup / Stabilization	TOTAL
Arizona	0	0	**0**	0	0	**0**	0	0	**0**
California	0	0	**0**	2	0	**2**	222	2,243	**2,465**
Colorado	0	0	**0**	0	280	**280**	40	4,899	**4,940**
Idaho	0	0	**0**	<0.5	4	**5**	1,517	1,732	**3,249**
Illinois	0	0	**0**	<0.5	0	**<0.5**	470	285	**755**
Iowa	0	0	**0**	0	0	**0**	0	0	**0**
Kentucky	0	0	**0**	0	0	**0**	0	1,721	**1,721**
Louisiana	0	0	**0**	0	0	**0**	0	0	**0**
Missouri	0	0	**0**	0	0	**0**	0	0	**0**
Montana	0	0	**0**	0	0	**0**	0	0	**0**
Nevada	0	0	**0**	0	0	**0**	0	548	**548**
New Jersey	0	0	**0**	0	0	**0**	15	0	**15**
New Mexico	0	0	**0**	99	42	**141**	605	1,573	**2,178**
New York	0	0	**0**	0	0	**0**	465	192	**657**
Ohio	0	0	**0**	0	0	**0**	480	307,939	**308,419**
Oklahoma	0	0	**0**	0	0	**0**	0	0	**0**
Pennsylvania	0	0	**0**	0	0	**0**	0	0	**0**
South Carolina	2,237	0	**2,237**	62	0	**62**	6,522	483	**7,005**
Tennessee	0	0	**0**	3	3	**6**	2,638	512	**3,150**
Texas	0	0	**0**	0	0	**0**	55	1,265	**1,320**
Utah	0	0	**0**	0	0	**0**	0	0	**0**
Virginia	0	0	**0**	0	0	**0**	14	0	**14**
Washington	0	0	**0**	5	18	**22**	612	17,534	**18,146**
West Virginia	0	0	**0**	0	0	**0**	0	0	**0**
TOTAL	**2,237**	**0**	**2,237**	**172**	**346**	**518**	**13,653**	**340,927**	**354,581**

Table 2.4 (Continued)
1998 DOE Waste Generation by State and Waste Type (in Cubic Meters)

State	Low-Level Mixed			Hazardous			Sanitary			GRAND TOTAL
	Routine	Cleanup / Stabilization	TOTAL	Routine	Cleanup / Stabilization	TOTAL	Routine	Cleanup / Stabilization	TOTAL	
Arizona	0	0	**0**	11	0	**11**	19	0	**19**	**30**
California	94	14	**108**	364	1,451	**1,815**	3,083	3,418	**6,502**	**10,891**
Colorado	<0.5	452	**452**	17	28	**45**	5,456	2,711	**8,166**	**13,882**
Idaho	61	746	**806**	24	20	**44**	2,842	4,271	**7,113**	**11,217**
Illinois	<0.5	0	**<0.5**	335	1,167	**1,502**	1,161	1,045	**2,206**	**4,463**
Iowa	0	0	**0**	9	0	**9**	0	0	**0**	**9**
Kentucky	0	253	**253**	0	0	**0**	5	3,969	**3,974**	**5,948**
Louisiana	0	0	**0**	1	0	**1**	240	0	**240**	**241**
Missouri	0	0	**0**	100	2,030	**2,130**	0	5,943	**5,943**	**8,073**
Montana	0	0	**0**	76	0	**76**	272	18	**291**	**366**
Nevada	0	263	**263**	51	18	**68**	6,461	1,647	**8,108**	**8,987**
New Jersey	0	0	**0**	12	148	**160**	89	0	**89**	**264**
New Mexico	6	523	**528**	451	1,626	**2,077**	6,812	6,323	**13,135**	**18,059**
New York	8	0	**8**	156	2,488	**2,644**	1,086	0	**1,086**	**4,395**
Ohio	48	520	**568**	5	97	**102**	500	2,195	**2,695**	**311,784**
Oklahoma	0	0	**0**	14	15	**29**	1	15	**16**	**45**
Pennsylvania	0	0	**0**	6	122	**128**	89	0	**89**	**217**
South Carolina	463	32	**495**	177	1,638	**1,815**	2,641	2,250	**4,891**	**16,506**
Tennessee	359	1,664	**2,023**	48	1,316	**1,364**	8,008	1,938	**9,946**	**16,489**
Texas	2	0	**2**	156	977	**1,132**	841	0	**841**	**3,295**
Utah	0	0	**0**	0	0	**0**	17	0	**17**	**17**
Virginia	0	0	**0**	4	0	**4**	225	0	**225**	**242**
Washington	158	505	**663**	51	124	**175**	888	457	**1,345**	**20,351**
West Virginia	0	0	**0**	<0.5	0	**<0.5**	24	0	**24**	**25**
TOTAL	**1,198**	**4,970**	**6,169**	**2,067**	**13,264**	**15,331**	**40,761**	**36,200**	**76,961**	**455,796**

Chapter 3

Pollution Prevention Accomplishments

Chapter Three discusses Calendar Year 1998 DOE Complex-wide programmatic and site pollution prevention accomplishments, including key pilot programs and new initiatives, waste reduction and reported cost savings/avoidance by pollution prevention activity category, and activities in public involvement, outreach, and research and development.

3.1 Waste Management Re-Engineering

The Office of Environmental Management, created in 1989, has had responsibility for the cost of waste management for DOE's many mission programs. In 1995, two reports to the Environmental Management program, the National Academy of Sciences, and the Independent Technical Review Team recommended shifting the responsibility for newly generated waste back to the mission programs. The studies showed that if the waste generator paid the cost of managing waste, the waste generators, as decisionmakers, would be motivated to consider alternatives that reduce the generation of waste. In Fiscal Year 1997, this concept was pilot tested at 14 sites across the DOE Complex to determine what method would work best at various sites. The 14 Pilot Projects involved six Operations Offices (Albuquerque, Chicago, Idaho, Oak Ridge, Oakland, and Savannah River) and four mission programs (Defense Programs, Environmental Management, Nuclear Energy, and Office of Science). In Fiscal Year 1998, the Pilot Projects continued to report success and progress towards achieving the goals of Re-Engineering.

In Fiscal Year 1998, five sites completed Re-Engineering budget transfers (the Argonne National Laboratory – West, Fermi National Accelerator Laboratory, Kansas City Plant, Savannah River Site, and the Stanford Linear Accelerator Center). Four sites were transferred to Defense Programs at the beginning of Fiscal Year 1999 (the Los Alamos National Laboratory, Pantex Plant, Sandia National Laboratories/California, and Sandia National Laboratories/New Mexico). Six Office of Science sites are under consideration for transfer in Fiscal Year 2001 (Ames Laboratory, Argonne National Laboratory – East, Brookhaven National Laboratory, Lawrence Berkeley National Laboratory, Pacific Northwest National Laboratory, and Princeton Plasma Physics Laboratory). Preliminary results indicate that mission program generators are seeking and implementing alternatives to reduce waste generation due to the high cost of waste handling and disposal.

3.2 Pollution Prevention and Energy Efficiency in Design at DOE Facilities

The incorporation of Pollution Prevention (P2) and Energy Efficiency (E2) in the design of a facility ("P2 in Design") has the potential for significant cost savings. DOE's P2 in Design program began in Fiscal Year 1995, and over the past three years, over 25 project teams have been trained, and electronic tracking systems and guidance documents have

been distributed throughout the DOE Complex. Although millions of dollars in avoided costs are documented, pollution prevention and energy efficiency concepts are not systematically applied to the design of DOE's new facilities or to facility modifications.

Under the direction of the Secretary, P2 in Design should become a fundamental part of the Life-Cycle Asset Management process at each site in the DOE Complex. Each DOE organization that acquires a new facility or modifies an existing facility will be required to use Life-Cycle Asset Management principles to maximize beneficial pollution prevention and energy efficiency opportunities during design. By making pollution prevention and energy efficiency a routine part of all facility design activities, DOE will significantly reduce the environmental costs of a facility over its lifetime.

3.3 Chiller Phaseout Goal

In 1998, Secretary of Energy Richardson issued a memorandum establishing a departmental goal for the phaseout of Class I ozone-depleting substances which are used for refrigeration and air conditioning in many DOE chillers. DOE's goal is to retrofit or replace all DOE chillers manufactured prior to 1984 that use Class 1 refrigerants, with greater than 150 tons of cooling capacity, by the year 2005. An exception process will be established for individual chillers where retrofit or replacement is not cost effective. Meeting this goal will eliminate 50 percent of DOE's use of Class I refrigerants, and will reduce energy costs by $6 million per year over the projected 23-year life of the chillers.

3.4 National Metals Recycling Program

The National Center of Excellence for Metals Recycle (NMR) is the DOE Complex-wide lead for aggressively pursuing the recycle and reuse alternatives for scrap and surplus metals. Established in September 1997, this program is designed to educate, promote, and facilitate recycle and reuse opportunities.

The environmental and economic benefits resulting from recycle and reuse are significant, according to a recent study completed by a team of multidisciplinary scientists at the Argonne National Laboratory. In comparison to utilizing virgin replacement materials, recycling reduces health risks by 50 percent, water usage by 40 percent, and energy usage by 70 percent. In addition, water pollution is decreased by 80 percent, air pollution by 90 percent, and raw material usage by 90 percent. As DOE budgets continue to decline, the cost savings/avoidance realized through recycle and reuse become increasingly important. Enhanced efficiencies due to recycle and reuse practices will allow DOE to accelerate cleanup and closure schedules, and to lower overall life-cycle cleanup costs.

In Fiscal Year 1998, the NMR facilitated the recycle or sale for reuse of approximately 946 metric tons of material, for a reported cost savings/avoidance of over $4 million. The NMR has succeeded in the development and implementation of project-specific sales agreements, a national sales agreement, and a national partnering agreement to get materials into the commercial market. The free-release of clean materials, or the

restricted release of contaminated materials to licensed facilities, accomplishes this objective.

In 1998, the NMR facilitated the recycle and reuse of 139 metric tons of materials at the Weldon Spring Site Remedial Action Project, approximately 244 metric tons of metal pallets from the East Tennessee Technology Park, and approximately 497 metric tons of metal and concrete from the Oak Ridge National Laboratory's Tower Shielding Facility. In partnership with industry, the NMR made a sales agreement for the reuse of 14,000 drums from the Oak Ridge Operations Office, avoiding approximately 54 metric tons (2,339 drums) in Fiscal Year 1998; and a reuse agreement with a commercial disposal facility for 6,000 stockpiled B-25 boxes, reusing 35 boxes (approximately 13 metric tons) in Fiscal Year 1998.

The amount of material recycled/reused is expected to increase significantly as the NMR continues to work with DOE sites, regulators, and industry to expedite over 70 recycle/reuse opportunities identified throughout the DOE Complex. For more information, visit the NMR Web site at http://www.oakridge.doe.gov/astutl/metals/.

3.5 Environmental Management Program Integration

The goal of Environmental Management Program Integration is to achieve program efficiencies by eliminating redundant facilities and using available capacity, crossing program boundaries or removing "stovepipes," taking advantage of the collective learning curve, applying site successes and lessons learned nationwide, employing innovative technologies, and using national procurement vehicles to meet unique needs. Integration requires corporate thinking on the part of DOE headquarters and field managers, looking at broader interests than a single program or site, and focusing on those needs which achieve the cleanup vision in an optimized fashion. Integration ensures an overall, consistent approach to address national policy issues and issues that affect more than one site. For more information, visit the Environmental Management Program Integration Web site at http://www.em.doe.gov/progint/.

The Department has saved hundreds of millions of dollars by implementing pollution prevention technologies/practices. If implemented systematically across the DOE Complex, as part of the Environmental Management Program integration effort, these technologies/practices could reduce the life-cycle cost, and could accelerate closure schedules. The Office of Pollution Prevention has proposed the following technologies/practices for greater implementation: Contaminated Area Rollback Process (Low-Level Radioactive Waste), Re-Characterization and Repackaging of Transuranic Waste, Segmented Gate System, Waste Sorting Facility, and Material Exchange System. For more information, contact the Office of Pollution Prevention.

3.6 Pollution Prevention Opportunity Assessments (PPOAs)

As cost-effective pollution prevention and waste minimization practices become increasingly important, the Pollution Prevention Opportunity Assessment (PPOA) is one tool that aids DOE sites in focusing their waste minimization efforts in areas that provide the most benefit while minimizing cost. The PPOA process is performed in three steps: 1) identification of the type and amount of the wastestream generated from a process or activity, 2) identification of the opportunities that exist for pollution prevention and waste minimization, and 3) evaluation of the identified opportunities for feasible implementation.

The first step, identification of the wastestream, is a critical component of the PPOA, and may be performed using various sources of data, including permits, monitoring reports, hazardous waste manifests or reports, emission or toxic substance release inventories, and waste analyses.

In the second step, pollution prevention and waste minimization opportunities are identified, and techniques and practices that are appropriate for reducing the particular wastestream are selected. These techniques and practices include source reduction options such as material substitution, process change, product reformulation, equipment change, operational improvement, schedule change, affirmative procurement, and administrative controls (inventory control, employee training, policies, etc.); and recycle/reuse options. Source reduction options are preferred over recycle/reuse options because they prevent the generation of waste.

In the third step, the opportunities are evaluated based on the principal waste minimization benefit; cost-effectiveness; technical feasibility; product, health, and safety implications; and time constraints. After the three steps are completed, the PPOA indicates the preferred method(s) for managing the particular wastestream.

DOE has developed worksheets, guidance documents, training courses, and a graded approach methodology to assist sites in conducting PPOAs. The graded approach provides a cost-effective and flexible methodology that allows sites to prioritize their individual wastestreams and align their efforts with allocated resources, while maintaining consistency in the conduct of PPOAs across the DOE Complex.

The next DOE site PPOA training course is scheduled to be held October 26-27, 1999, at the North Las Vegas Facility. For more information on the PPOA training course, contact the National Environmental Training Office by E-mail at NETO@srs.gov.

3.7 Accomplishments and Reported Cost Savings / Avoidance by Pollution Prevention Activity Category

In 1998, 33 DOE sites collectively reported 650 pollution prevention projects, with a total waste reduction of approximately 148,100 cubic meters. Note that projects that are primarily waste treatment or solely physical volume reduction (e.g., compaction, repackaging of waste, and reduction of bulk liquid wastes) are excluded. Wastewater

projects are also excluded from the project total, but are presented separately in Section 3.8 of this Report.

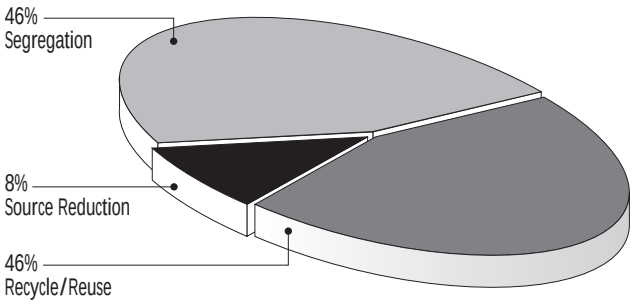
Projects such as pollution prevention opportunity assessments and training, award fees, and outreach activities which do not result in a quantifiable waste reduction but are critical in promoting pollution prevention are not included in the project total, but have been defined as programmatic activities, and are presented in Section 3.9.

Descriptions of pollution prevention projects, wastewater projects, and programmatic activities can be accessed on the Office of Pollution Prevention Web site at http://www.em.doe.gov/wastemin (select EM-77 Web site) or http://twilight.saic.com/wastemin/.

For the purpose of this Report, pollution prevention projects are grouped into three activity categories: source reduction, segregation, and recycle/reuse. Source reduction projects reduce pollution or waste generated at the source, segregation projects separate materials and/or wastestreams for potential reuse, and recycle/reuse projects divert useful materials from disposal.

Figure 3.1 illustrates waste reduction by pollution prevention activity category for the DOE Complex for 1998. Segregation projects were responsible for 46 percent of the total 1998 waste reduction, while making up only four percent of the total 1997 waste reduction. While it is difficult to draw conclusions based on a one-year trend, the increase in segregation projects may be an indication that sites are refining their waste management activities to include separating various wastestreams, either to minimize the amount of disposal for an expensive wastestream, or to decontaminate a portion of the waste for reuse, rather than handling the entire amount as a mixed wastestream, as was done in the past.

Figure 3.1
1998 Complex-Wide Waste Reduction by Pollution Prevention Activity Category (in Cubic Meters)



Total Waste Reduction = 148,113 Cubic Meters

The largest segregation project, the decontamination of Building K-1401 and associated equipment at East Tennessee Technology Park for reuse by DOE, the public, and a private contractor, reduced approximately 9,100 cubic meters of low-level radioactive waste. The largest recycle/reuse project, the use of coal ash as fill material at the Oak Ridge Y-12 landfill, reduced approximately 8,800 metric tons of sanitary waste. The largest source reduction project, a release to cleanup standards of the C-Reactor Safety Storage structure at the Hanford Site, reduced approximately 5,800 cubic meters of low-level radioactive waste through use of the Residual Radiation (RESRAD) Model.

In addition to the environmental benefits realized from pollution prevention projects, significant financial benefits to DOE and the taxpayer are also realized. Pollution prevention projects in 1998 resulted in a total reported cost savings/avoidance of approximately $159.4 million, as compared to $101 million in 1997. Figure 3.2 presents a comparison of 1997 and 1998 reported cost savings/avoidance for each Operations/Field Office, and shows that seven of the 10 Operations/Field Offices, plus Headquarters, reported an increased pollution prevention savings from 1997 to 1998.

Figure 3.2
Comparison of 1997 and 1998 Reported Cost Savings / Avoidance by Operations / Field Office (in Millions of Dollars)

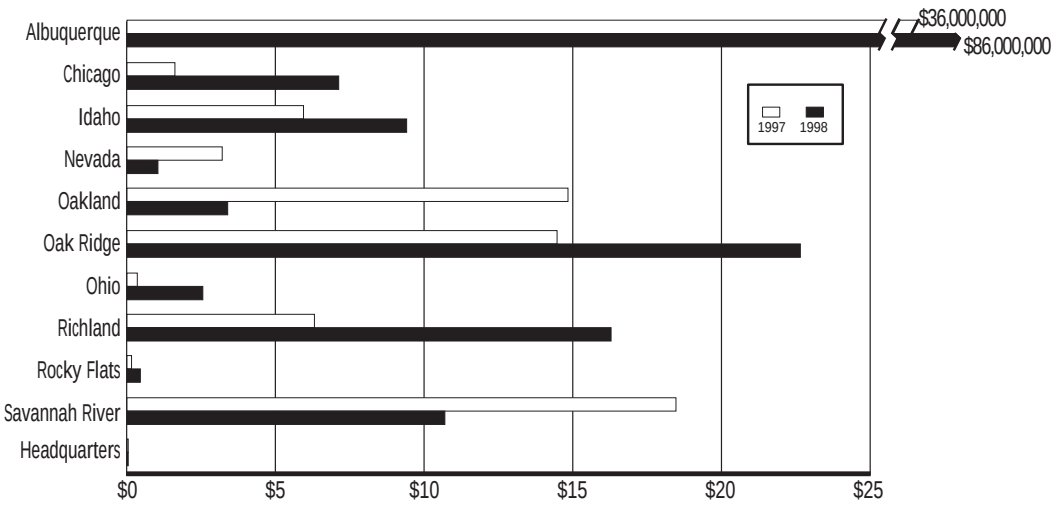
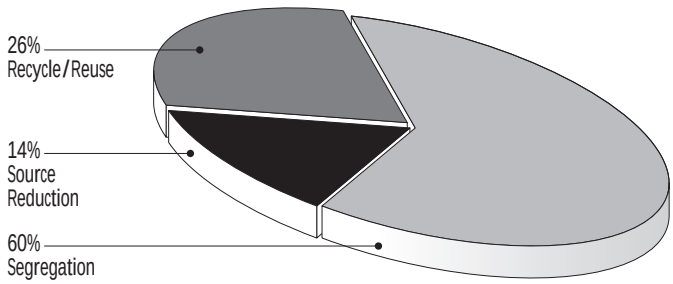


Figure 3.3
1998 Complex-Wide Waste Reduction Reported Cost Savings / Avoidance by Pollution Prevention Activity Category



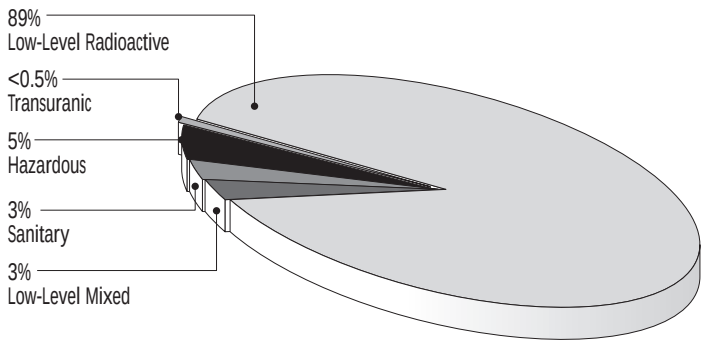
Total Reported Cost Savings / Avoidance = $159,362,525

Figure 3.3 illustrates reported cost savings/avoidance from waste reduction by pollution prevention activity category for the DOE Complex. Sixty percent of the total reported cost savings/avoidance in 1998 resulted from segregation projects. The segregation projects that resulted in the largest cost savings/avoidance were two projects at the Los Alamos National Laboratory that saved a total of $72.6 million through the survey, free-release, and recycling of various metals. The recycling project that resulted in the largest cost savings/avoidance was a project at the Oak Ridge National Laboratory that saved approximately $9 million by selling unused sodium back to the original vendor. Source reduction projects that resulted in large cost savings/avoidance include Contaminated Area Rollback projects at the Savannah River Site that saved approximately $5 million by reclaiming over 100 Radiological Control Areas, thus eliminating the generation of low-level radioactive waste and laundry.

Figures 3.4 through 3.6 illustrate waste reduction by waste type for each pollution prevention activity category for the DOE Complex. Approximately 89 percent of the waste reduced by source reduction projects involved low-level radioactive waste. The largest contributor to the low-level radioactive waste reduction was the release of the C-Reactor Safety Storage Structure at the Hanford Site discussed previously.

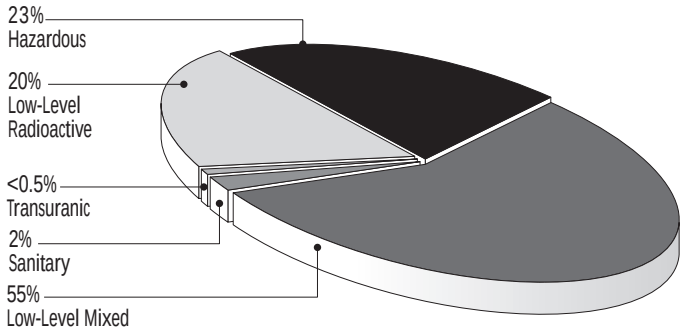
Fifty-five percent of the waste reduced by segregation projects involved low-level mixed waste. The largest contributor to the low-level mixed waste reduction was a survey for free-release project at the Oak Ridge National Laboratory which reduced approximately 36,300 cubic meters of low-level mixed waste through the free-release of tower shielding material.

Approximately 90 percent of the waste reduced by recycle/reuse projects involved sanitary waste. The largest contributor to the sanitary waste reduction was the coal ash reuse project at the Oak Ridge Y-12 Plant, described previously, which reduced



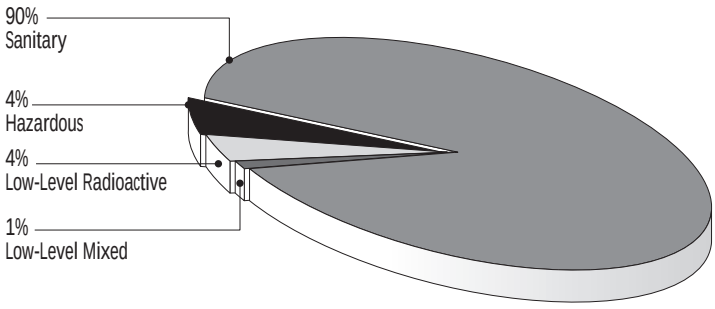
Total Waste Reduced from Source Reduction Projects = 12,585 Cubic Meters

Figure 3.4
1998 Complex-Wide Waste Reduction from Source Reduction Projects by Waste Type



Total Waste Reduced from Segregation Projects = 67,864 Cubic Meters

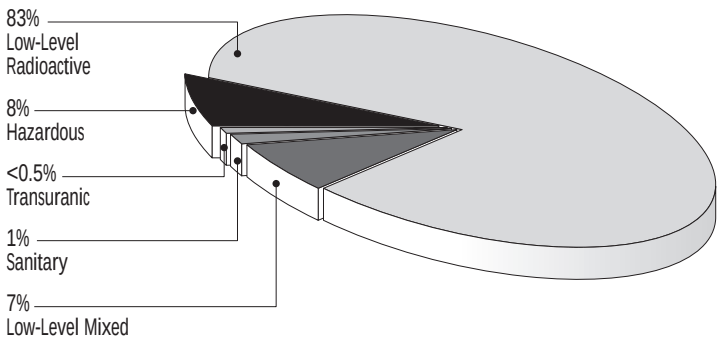
Figure 3.5
1998 Complex-Wide Waste Reduction from Segregation Projects by Waste Type



Total Waste Reduced from Recycle / Reuse Projects = 67,665 Cubic Meters

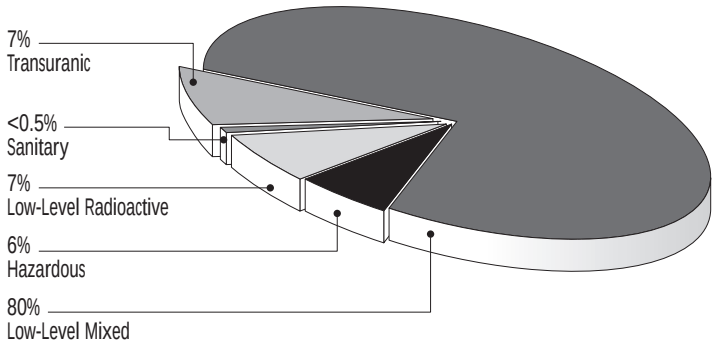
Figure 3.6
1998 Complex-Wide Waste Reduction from Recycle / Reuse Projects by Waste Type

Figure 3.7
1998 Complex-Wide Source Reduction Reported Cost Savings / Avoidance by Waste Type



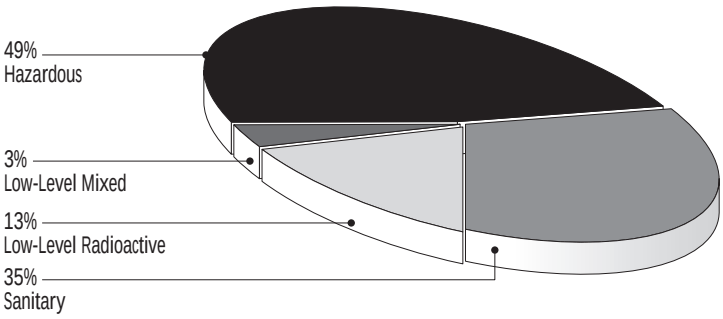
Total Reported Cost Savings / Avoidance from Source Reduction Projects = $22,466,981

Figure 3.8
1998 Complex-Wide Segregation Reported Cost Savings / Avoidance by Waste Type



Total Reported Cost Savings / Avoidance from Segregation Projects = $95,775,329

Figure 3.9
1998 Complex-Wide Recycle / Reuse Reported Cost Savings / Avoidance by Waste Type



Total Reported Cost Savings / Avoidance from Recycle / Reuse Projects = $41,120,215

approximately 8,800 metric tons of sanitary waste. In addition, three recycling projects at the Strategic Petroleum Reserve Project Management Office reduced a total of approximately 11,000 metric tons of sanitary waste by recycling brine, calcium sulfate, and scrap metal (note that the brine is actually characterized as a nonhazardous State-regulated waste, which has been reclassified as sanitary waste for this Report).

Figures 3.7 through 3.9 illustrate reported cost savings/avoidance from waste reduction projects by waste type for each pollution prevention activity category for the DOE Complex. Eighty-three percent of the total reported cost savings/avoidance from source reduction projects involved low-level radioactive waste. Large contributors to the low-level radioactive waste cost savings/avoidance include the Savannah River Site Contaminated Area Rollback projects described previously.

Eighty percent of the total reported cost savings/avoidance from segregation projects involved low-level mixed waste. The largest contributors to the low-level mixed waste cost savings/avoidance include Los Alamos National Laboratory's two metals survey and recycling projects, with a total reported cost savings/avoidance of $72.6 million.

Forty-nine percent of the total reported cost savings/avoidance from recycle/reuse projects involved hazardous waste. The largest contributor to the hazardous waste cost savings/avoidance is the Oak Ridge National Laboratory's project for the resale of sodium back to the original vendor, with a total reported cost savings/avoidance of $9 million.

3.8 Wastewater Projects

In 1998, 26 projects that reduced wastewater were reported across the DOE Complex, for a total waste reduction of approximately 67,400 cubic meters, and a reported cost savings/avoidance of $25.6 million (Table 3.1). Figure 3.10 presents wastewater projects by waste type. Examples of wastewater projects completed in 1998 include:

Table 3.1 1998 Wastewater Projects by Operations / Field Office*

Operations / Field Office*	Number of Wastewater Projects	Waste Reduction (Cubic Meters)	Reported Cost Savings / Avoidance (Thousands)
Albuquerque	1	3	2
Chicago	3	4,103	8
Oak Ridge	10	4,246	5,235
Richland	9	57,850	20,038
Savannah River	2	2	6
Headquaters	1	1,181	312
TOTAL	**26**	**67,385**	**25,600**

* Operations/Field Offices that did not report wastewater projects are not included in this table.

- Contaminated groundwater from the 100-N Basin at the Hanford Site was removed and transported to the Effluent Treatment Facility for processing. This segregation activity reduced cleanup/stabilization low-level radioactive waste by 42,200 cubic meters, for a reported cost savings/avoidance of $9.5 million.

- At the Oak Ridge National Laboratory, tank supernate (liquid remaining in a tank) was transferred to tanks with sludge, and was mixed with grout for use as a stabilizer. This source

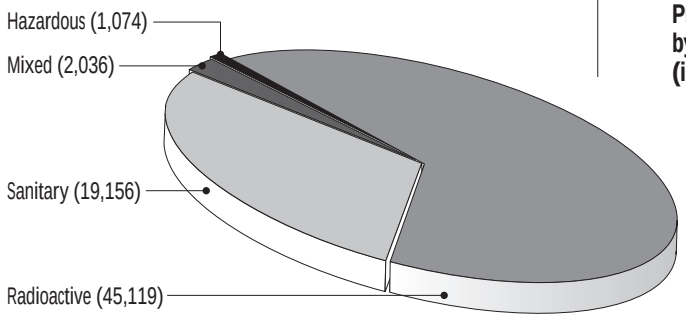


Figure 3.10 Complex-Wide Wastewater Projects by Waste Category (in Cubic Meters)

reduction activity reduced cleanup/stabilization low-level radioactive waste by 1,135 cubic meters, for a reported cost savings/avoidance of $3.1 million.

- Water used in the Yucca Mountain Site Characterization Office Exploratory Studies Facility was filtered to remove hydrocarbon contaminants, tested, and used as a dust suppressant. This recycle/reuse activity reduced routine operations sanitary waste by 1,181 metric tons, for a reported cost savings/avoidance of $312,000.

- The Savannah River Site implemented a new method for handling wastewater from the Defense Waste Processing Facility by sending nonradioactive wastewater to the Consolidated Sanitary Waste Treatment Facility, instead of processing it as a radioactive waste. This source reduction activity reduced routine operations low-level radioactive waste by two cubic meters, for a reported cost savings/avoidance of $3,000.

- Sandia National Laboratories/California implemented a new method to minimize purged groundwater during groundwater sampling. This source reduction activity reduced routine operations sanitary waste by three metric tons, for a reported cost savings/avoidance of $1,592.

- Cooling water from the Fuel Assembly and Storage Building at Argonne National Laboratory – West is now recirculated instead of being used once and sent to the waste lagoon. This source reduction activity reduced routine operations sanitary waste by 4,102 metric tons, for an undetermined cost savings/avoidance.

3.9 Programmatic Activities

The DOE Complex conducted 650 pollution prevention projects in 1998. This total does not include opportunity assessments, public awareness, research and development, training, or outreach activities. Although such activities do not result in quantifiable waste reductions or cost savings/avoidance, they are critical in promoting pollution prevention, and are encouraged and supported by DOE. Activities demonstrating public involvement, outreach, and research and development within the DOE Complex in 1998 include:

Albuquerque Operations Office

- The DOE Center of Excellence for Solvent Substitution was initiated in April 1996 to eliminate hazardous and low-level mixed wastestreams associated with weapons maintenance, refurbishment, and dismantling activities within DOE and the Department of Defense. The project leaders are the Pantex Plant and Sandia National Laboratories/California. Key consultants include the Kansas City Plant, Lawrence Livermore National Laboratory, and the Los Alamos National Laboratory. The Project Team is currently working to identify and test replacement solvents which 1) introduce no new unacceptable hazards into the workplace, 2) reduce or eliminate generation of hazardous waste, 3) are compatible with current

materials, 4) are operationally feasible, and 5) perform effectively. A successful effort would result in a significant cost savings/avoidance to DOE and taxpayers of approximately $15.8 million annually.

Chicago Operations Office

- In August 1998, Argonne National Laboratory – East's waste minimization and pollution prevention staff attended a DuPage County Solid Waste Committee Meeting to discuss funding of a Pilot Program to provide micro-scale education and hazardous waste assessments to 10 DuPage County High Schools. In September 1998, the Waste Minimization and Pollution Prevention Program hosted the Illinois Environmental Protection Agency's Pollution Prevention Program Graduate Intern Program's Presentation Session. Seven Northwestern University Graduate Interns presented their projects during the event.

- A Pollution Prevention and Waste Minimization Subject Area was developed for the Brookhaven National Laboratory which describes how staff plan, conduct, and closeout their work activities to eliminate or minimize the impact of their activities on the environment. The subject area provides steps to follow when planning work activities, guidance on the use of recycled materials, pertinent references and requirements, and was designed, in part, to implement the laboratory's policies and standards of performance related to environment, safety, and health commitments.

Idaho Operations

- Three pollution prevention displays from the Idaho National Engineering and Environmental Laboratory were exhibited to the public at the Teton Mall Safety Expo in May 1998. The displays presented information on "The 3 Rs" (Reduce, Reuse, Recycle), ways to avoid water pollution, home chemical safety, and the use of biodegradable chemicals.

Nevada Operations Office

- The Nevada Test Site participated in National P2 (Pollution Prevention) Week in September 1998. Activities included the opportunity to view the P2 Web home page, office supplies with recycled content, and the P2 display; kickoff of the P2 poster contest; promotional giveaways; and the signing of P2 commitment cards.

Oakland Operations Office

- The Lawrence Livermore National Laboratory is expanding its implementation of a commercially available bioremediative aqueous parts washer after the successful use of nine units that were delivered in early 1998. Use of the parts washer has reduced the generation of hazardous solvent waste.

- Using the Department of Energy Pollution Prevention Information Clearinghouse (EPIC), the Oakland Operations Office advertised its need for 200 containers for the packaging and transport of low-level radioactive waste from the Laboratory for Energy-Related Health Research (LEHR). The Savannah River Site offered the containers for the cost of transportation, at a cost savings of $400 per container, for a total estimated cost savings to LEHR of $80,000.

Oak Ridge Operations Office

- The Oak Ridge National Laboratory, the East Tennessee Technology Park, and the Oak Ridge Y-12 Plant teamed to develop the Pollution Prevention Information Management System (P2IMS). The P2IMS is an award-winning data base used to collect, track, and report pollution prevention (P2) progress to measure success, assist in meeting reporting requirements, and aid future planning. The P2IMS serves as a central repository for information relating to P2 activities and initiatives for the Oak Ridge Reservation, and has been demonstrated at several sites outside of the Oak Ridge Operations Office.

- In partnership with industry, the National Center of Excellence for Metals Recycle (NMR) made a sales agreement for the reuse of 14,000 drums from the Oak Ridge Operations Office, avoiding approximately 54 metric tons (2,339 drums), for a reported cost savings/avoidance of $103,000 for DOE, and $75,000 for the industrial vendor. Prior to the sales agreement, the drums would have been surveyed clean and sent to the onsite landfill, or to a commercial facility for treatment/disposal.

Ohio Field Office

- The Fernald Environmental Management Project established an electronic bulletin board to provide a mechanism for personnel to advertise office items for reuse, thus promoting material exchange and avoiding the disposal of excess items.

- The West Valley Demonstration Project instituted an Office Swap Savings program. Rather than buying new materials, employees reuse office supplies returned to the project warehouse. Reported savings for Calendar Year 1998 were $16,200.

Richland Operations

- The Hanford Site completed several Pollution Prevention Opportunity Assessments that focused on reducing waste volumes for major generators. Two assessments at the High-Level Analytical Laboratory included an investigation of ion chromatography to reduce liquid waste generation and replacement products to reduce paper waste generation. An assessment at the Tank Waste Remediation Facility evaluated ways to reduce low-level radioactive waste by establishing lay down areas with launderable tarps and using a new type of plastic splash guard. Asbestos waste was also addressed by investigating thermal conversion of asbestos and asbestos neutralizing.

- The Pacific Northwest National Laboratory requested a contractor to use the new FUMEGUARD Asphalt Fume Elimination System for the roofing of the Research Operations Building. The system is 99 percent effective at eliminating hydrocarbons and other volatile organic compounds released during normal roofing operations, thus minimizing air pollutant emissions.

Rocky Flats Field Office

- The Rocky Flats Environmental Technology Site provided funding and technical assistance to a local center for the arts for the development of a new program called "Talking Trash," an interdisciplinary program exploring the theme of recycling through the arts. The Rocky Flats pollution prevention team provided technical support for the creation of a take-home activity package for children and a study guide for teachers.

- The Rocky Flats Environmental Technology Site celebrated Earth Day in April, National Pollution Prevention Week in September, and America Recycles Day in November of 1998. During these events, the pollution prevention organization launched various pollution prevention awareness campaigns, contests, and recycle drives, and promoted local Colorado environmental activities to site employees.

Savannah River Operations Office

- An employee at the Savannah River Site submitted a waste minimization suggestion to decontaminate and relocate instrumentation, and reduce protective clothing changes within a contaminated area. Currently, tank operators are required to take instrumentation readings every four hours in a Contaminated Area (CA), which required the operator to dress in one pair of protective clothing. Upon completion of the CA Rollback and equipment relocation, the facility will realize increased productivity, reduced operator radiological exposure, and reduced low-level radioactive waste generation and laundry.

Headquarters

- Auto, truck and other air conditioners at the Western Area Power Administration are serviced by certified technicians using improved techniques for charging the equipment, thereby reducing or eliminating the escape of freon (an ozone depleting substance) into the atmosphere. In addition, freon from disposed air conditioners is reclaimed.

- The Yucca Mountain Site Characterization Office (YMSCO) performed a Pollution Prevention Opportunity Assessment (PPOA) to investigate options pertaining to the use and disposal of fluorescent lamps. The site currently manages spent fluorescent lamps as hazardous waste. The lamps are transported to a recycling contractor for the recovery of mercury, glass, metal and phosphor powders. As a result of the PPOA, the YMSCO initiated a program to purchase nonhazardous low-mercury lamps, which

will be used over time to replace the high mercury lamps, ultimately eliminating the hazardous wastestream.

For more information on these public involvement and outreach activities, please refer to the Point of Contact list in Appendix C.

3.10 Pollution Prevention Conference and Awards Program

The Office of Pollution Prevention, EM-77, sponsors an annual Pollution Prevention Conference, where attendees can participate in training sessions and seminars, and gather and share information on pollution prevention practices and techniques. The next conference will be held November 15-19, 1999, in Albuquerque, New Mexico. For more information, visit the Pollution Prevention Conference Web site at http://p2.sandia.gov/.

The Office of Pollution Prevention recognizes and congratulates DOE's best performers in pollution prevention through an annual awards ceremony. The 1998 awards were presented in conjunction with Earth Day activities in April 1999 in Washington, DC. Thirteen awards were presented by Secretary Richardson.

Table 3.2 Pollution Prevention Awards Presented in April 1999

Lifetime Achievement Award

Award Category	Project Title	Award Recipient
Sowing the Seeds for Change	*Visionary Leadership for the DOE Pollution Prevention Program*	Headquarters

Pollution Prevention Awards

Award Category	Project Title	Award Recipient
Affirmative Procurement	*Affirmative Procurement in the Department of Energy: Spreading the Message*	Headquarters
Complex-Wide Achievement	*Designing Pollution Prevention into DOE Facilities*	Savannah River Site
Environmental Preferability	*Replacement of Petroleum-Based Hydraulic Fluids With Soybean-Based Alternative*	Sandia National Laboratories/New Mexico
Environmental Restoration	*Old Hydrofracture Facility Project*	Oak Ridge National Laboratory
Information Sharing	*Oak Ridge Reservation Pollution Prevention Information System*	Oak Ridge National Laboratory
Integrated Planning and Design	*Use of Enhanced Work Planning to Identify Waste Minimization Opportunities in the H-Canyon Facility*	Savannah River Site
Model Facility Demonstration	*Pantex Plant: A Model Facility for Pollution Prevention*	Pantex Plant
Public Outreach and Partnership	*Pollution Prevention Awareness Across Multi-Media*	Hanford Site
Public Outreach and Partnership	*Statewide Essay Contest on Recycling for New Mexico High School Children (9th through 12th grades)*	Albuquerque Operations Office
Recycling	*Sanitary Waste Recycling and Reduction at Argonne National Laboratory – East*	Argonne National Laboratory – East
Sowing the Seeds for Change	*Pollution Prevention and Community Outreach*	Pantex Plant
Waste Prevention	*Onsite Recycling of Asphalt and Concrete*	Pantex Plant

Chapter 4

Operations/Field Office Pollution Prevention Progress

Chapter Four summarizes Calendar Year 1998 DOE Complex-wide waste generation, waste reduction, and recycling data, and presents 1998 Operations/Field Office waste generation and waste reduction data. Each Operations/Field Office mission is identified, pollution prevention performance and accomplishments are summarized for each reporting site, and waste generation data by Program Secretarial Office and waste type are reported.

4.1 DOE Complex-Wide Waste Generation and Pollution Prevention Accomplishments

There are 10 Operations/Field Offices within the DOE Complex: Albuquerque, Chicago, Idaho, Nevada, Oakland, Oak Ridge, Ohio, Richland, Rocky Flats, and Savannah River. All 10 Operations/Field Offices and Headquarters oversee sites that reported radioactive, hazardous, and sanitary waste generation in 1998.

Table 4.1 illustrates 1998 waste generation, waste reduction, and reported cost savings/avoidance by Operations/Field Office. Figures 4.1 through 4.3 depict 1998 waste reduction by Operation/Field Office from source reduction, segregation, and recycle/reuse projects, respectively, excluding wastewater projects. Tables 4.2 and 4.3 present waste generation by Operation/Field Office for routine operations and cleanup/stabilization activities, respectively.

Table 4.1
1998 Waste Generation, Waste Reduction, and Reported Cost Savings / Avoidance by Operations / Field Office

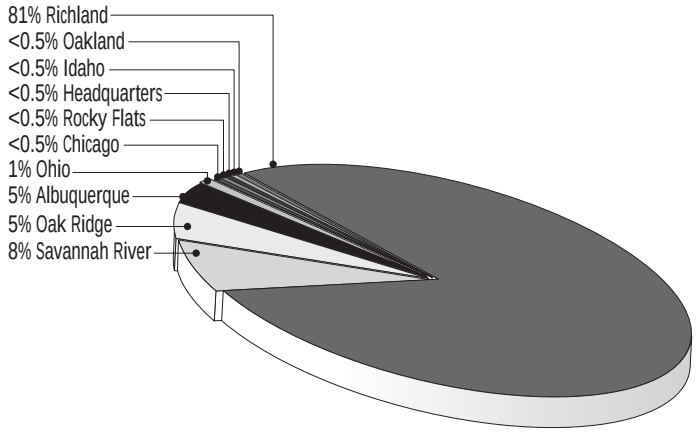
Operations / Field Office	Waste Generation (Cubic Meters)	Waste Reduction (Cubic Meters)	Reported Cost Savings / Avoidance* (from Waste Reduction)
Albuquerque	31,281	19,204	$86,017,000
Chicago	9,704	22,729	$7,050,000
Idaho	9,965	1,145	$9,410,000
Nevada	8,987	1,979	$892,000
Oakland	11,464	2,093	$3,381,000
Oak Ridge	25,075	64,887	$22,675,000
Ohio	311,752	1,882	$2,582,000
Richland	20,351	17,533	$16,269,000
Rocky Flats	8,518	1,634	$420,000
Savannah River	16,506	1,557	$10,588,000
Headquarters	2,194	13,470	$78,000
TOTAL	**455,796**	**148,113**	**$159,363,000**

* Numbers have been rounded to the nearest thousand dollars.

Albuquerque, Chicago, Oak Ridge, and Richland represent the Operations Offices that reduced the most waste in 1998. The top contributors to reported cost savings/avoidance within the DOE Complex in 1998 were the Albuquerque, Oak Ridge, Richland, and Savannah River Operations Offices. The Chicago, Idaho, and Oakland Operations Offices and the Ohio Field Office also significantly contributed to reported cost savings/avoidance within the DOE Complex. In total, the DOE Operations/Field Offices have contributed to approximately $159.4 million of savings in 1998 due to prudent waste management and pollution prevention.

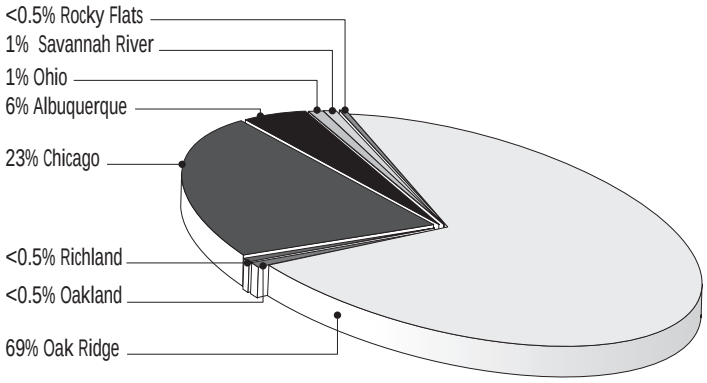
The Richland Operations Office reduced the most waste in the source reduction activity category, accounting for 81 percent of the total 1998 waste reduction. For segregation, the Oak Ridge and Chicago Operations Offices were the largest contributors, accounting

Figure 4.1
1998 Waste Reduction by Operations / Field Office from Source Reduction Projects



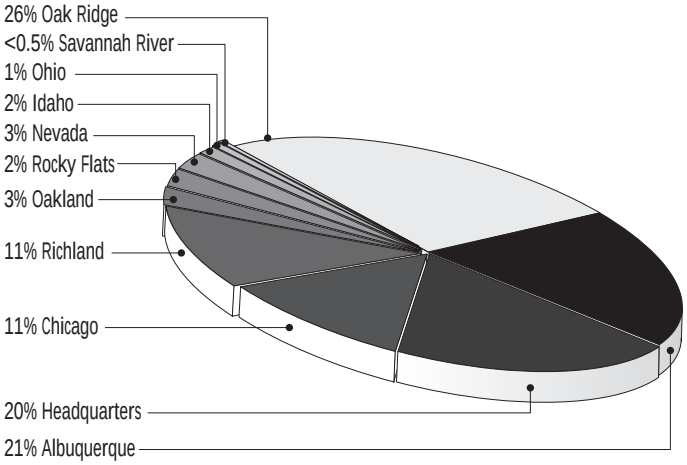
Total Waste Reduced by Source Reduction Projects = 12,585 Cubic Meters

Figure 4.2
1998 Waste Reduction by Operations / Field Office from Segregation Projects



Total Waste Reduced by Segregation Projects = 67,864 Cubic Meters

Figure 4.3
1998 Waste Reduction by Operations / Field Office from Recycle / Reuse Projects



Total Waste Reduced by Recycle / Reuse Projects = 67,665 Cubic Meters

Table 4.2
1998 Routine Operations Waste Generation by Operations / Field Office and Waste Type (in Cubic Meters)

ROUTINE OPERATIONS

Operations / Field Office	High-Level	Transuranic	Low-Level Radioactive	Low-Level Mixed	Hazardous	Sanitary
Albuquerque	0	99	700	8	705	11,047
Chicago	0	<0.5	1,017	7	487	2,878
Idaho	0	0	1,243	60	21	1,957
Nevada	0	0	0	0	50	6,461
Oakland	0	2	222	94	362	3,382
Oak Ridge	0	3	2,651	359	52	8,238
Ohio	0	0	686	49	33	843
Richland	0	5	612	158	51	888
Rocky Flats	0	0	0	0	0	531
Savannah River	2,237	62	6,522	463	177	2,641
Headquarters	0	0	0	0	128	1,895
TOTAL	**2,237**	**172**	**13,653**	**1,198**	**2,067**	**40,761**

Table 4.3
1998 Cleanup / Stabilization Waste Generation by Operations / Field Office and Waste Type (in Cubic Meters)

CLEANUP / STABILIZATION

Operations / Field Office	High-Level	Transuranic	Low-Level Radioactive	Low-Level Mixed	Hazardous	Sanitary
Albuquerque	0	42	2,877§	588	4,632	10,581
Chicago	0	0	461	5	3,803	1,045
Idaho	0	4	1,648	741	20	4,271
Nevada	0	0	548	263	18	1,647
Oakland	0	0	2,243	14	1,451	3,695
Oak Ridge	0	3	2,478§	2,365§	1,334§	7,591
Ohio	0	0	307,795	71	79	2,195
Richland	0	18	17,534	505	124	457
Rocky Flats	0	280	4,859	387	28	2,434
Savannah River	0	0	483	32	1,638	2,250
Headquarters	0	0	0	0	137	34
TOTAL	**0**	**346**	**340,927**	**4,970**	**13,264**	**36,200**

§ Excludes 11e(2) byproduct material (soil or other material contaminated by extraction or concentration or uranium or thorium). Two sites reported byproduct material in 1998. The Weldon Spring Site Remedial Action Project reported 215,500 cubic meters of low-level radioactive waste, 1,090 cubic meters of low-level mixed waste, and 19 metric tons of State regulated waste. The Grand Junction Projects Office reported 100 cubic meters of low-level radioactive waste.

for 69 and 23 percent, respectively, of the total 1998 waste reduction. For recycle/reuse, the Oak Ridge Operations Office was the largest contributor, accounting for approximately 26 percent of the total 1998 waste reduction.

4.2 DOE Complex-Wide Recycling Activities

Approximately 68 percent of the pollution prevention projects reported in 1998 involved recycling activities. Recycling activities are traditionally associated with sanitary waste; however, radioactive and hazardous waste reductions also result from recycling activities. Fifty-six percent of the recycling projects reported in 1998 reduced sanitary waste. By contrast, six percent, three percent, and 35 percent of the recycling projects reduced radioactive, mixed, and hazardous waste, respectively. Examples of recyclable materials are listed below, and a breakdown of materials recycled in 1998 is presented in Table 4.4.

- Paper Products - office and mixed paper, corrugated cardboard, newspaper, phone books, magazines
- Scrap Metals - stainless steel, copper, iron, aluminum, aluminium cans, lead, zinc, and other types of metals not clarified
- Precious Metals - silver, gold, platinum, and other types of metals not clarified
- Automotive - batteries, engine oils, and tires
- Other - glass, plastic, styrofoam, toner cartridges, food waste, concrete, wood, engine coolant, and any other items that do not fit into the previous categories

Please note that data may have been rounded in the following pages of this Chapter, the Program Secretarial Office (PSO) waste generation pie charts do not include sanitary waste (as this data is not collected by PSO), and pollution prevention project data exclude wastewater projects.

Table 4.4
1998 DOE Recycling Activities by Operations / Field Office (in Metric Tons)

Operations / Field Office	Paper Products	Metals†	Automotive	Other	Other Explanations††	TOTAL†††
Albuquerque	1,204	3,245	313	18,744§	Largest contributors include 6,900 metric tons of asphalt and 6,800 metric tons of concrete.	23,505
Chicago	1,282	2,182	35	5,560	Largest contributor includes 2,200 metric tons of construction / demolition debris.	9,060
Idaho	260	784	127	242	Largest contributors include 120 metric tons of wood and 110 metric tons of concrete.	1,412
Nevada	256	1,336	131	16	Largest contributor includes 15 metric tons of wood.	1,739
Oakland	847	2,577	110	7,949§§	Largest contributor includes 6,300 metric tons of concrete.	11,482
Oak Ridge	1,030	3,740	221	22,461§§§	Largest contributor includes 8,800 metric tons of fly ash.	27,453
Ohio	245	487	3	541	Largest contributor includes 350 metric tons of concrete.	1,275
Richland	653	1,637	102	4,711	Largest contributor includes 3,800 metric tons of concrete.	7,103
Rocky Flats	314	763	72*	131	Largest contributor includes 50 metric tons of low-dollar non-accountable property such as office supplies, piece parts, and small tools.	1,280
Savannah River	562	3,113	42	1,070	Largest contributor includes 680 metric tons of material recycled through a contract with a local municipal material recovery facility.	4,787
Headquarters	481	1,595	139	1,501	Largest contributor includes 600 metric tons of mineral oil dielectric fluid.	3,716
TOTAL	**7,134**	**21,457**	**1,294**	**62,926**		**92,812**

† Scrap metal, precious metal, and aluminum can quantities are added together in the "metals" column.

†† Other materials may also include: plastic, styrofoam, glass, toner cartridges, food/garden waste, concrete, wood, fluorescent light tubes, coolant, filters, solvents, photographic materials, ground circuit boards, chemicals, small animal exposure tubes, paint adhesives, brick, non-process wastewater, furniture/office equipment, engine coolant, and fly ash.

††† Quantities are estimates that have been rounded to the nearest whole number, assuming that one cubic meter is equivalent to one metric ton. Materials sent offsite for handling to be recycled by another party are not included in these estimates.

§ Excludes 624 metric tons of recycled soil from the Kansas City Plant, as this activity is typically not considered pollution prevention because soil is ultimately disposed.

§§ Excludes 24,601 metric tons of recycled soil from the Lawrence Livermore National Laboratory and 397 metric tons of soil from Lawrence Berkeley National Laboratory, as this activity is typically not considered pollution prevention because soil is ultimately disposed.

§§§ Excludes 53,357 tons of recycled aggregate at the Weldon Spring Site Remedial Action Project, as this activity is typically not considered pollution prevention because material is ultimately disposed.

* This quantity includes the weight of batteries, many of which are non-automotive, i.e., emergency power supply batteries, emergency exit sign batteries, and fork-truck batteries.

Albuquerque Operations Office
Calendar Year 1998 Achievements

Number of Pollution Prevention Projects:	**98**
Total Waste Reduced:	**19,200 cubic meters**
Reported Cost Savings / Avoidance:	**$86 million**

Category	Performance Measure*	CY 99 Goal
Radioactive Waste	69% reduction	50%
Mixed Waste	86% reduction	50%
Hazardous Waste	71% reduction	50%
Sanitary Waste	51% reduction	33%
Recycling	52% recycled	33%
Affirmative Procurement	70% purchased	100%

* Performance measure comparison is from 1993 to 1998, except for recycling and affirmative procurement, for which performance is assessed annually.

Figure 4.4
1998 Albuquerque Operations Office Pollution Prevention Waste Reduction by Waste Category (in Cubic Meters)

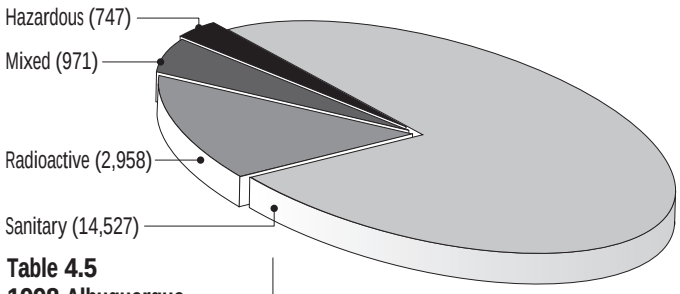


Table 4.5
1998 Albuquerque Operations Office Pollution Prevention Accomplishments by Site

Site Name; Location	Number of Pollution Prevention Projects	Waste Reduction (Cubic Meters)	Reported Cost Savings / Avoidance (Thousands)
Grand Junction Projects Office; Grand Junction, CO	13	474	$17.9
Kansas City Plant; Kansas City, MO	8	9	$8
Los Alamos National Laboratory; Los Alamos, NM	37	10,221	$82,319
Pantex Plant; Amarillo, TX	21	6,975	$1,629
Sandia National Laboratories / California; Albuquerque, NM	5	35	$1,514
Sandia National Laboratories / New Mexico; Albuquerque, NM	5	1,365	$525
Waste Isolation Pilot Plant; Carlsbad, NM	9	125	$4

4.3 Albuquerque Operations Office

The Albuquerque Operations Office provides field level federal management to assure effective, efficient, safe, and secure accomplishment of DOE's national defense, environmental quality, science and technology, technology transfer and commercialization, and national energy objectives.

4.3.1 Pollution Prevention Performance

In 1998, approximately 19,200 cubic meters of waste were reduced at seven of the Albuquerque Operations Office's reporting sites through implementation of pollution prevention projects (Figure 4.4). As a result, the Albuquerque Operations Office reduced the cost of operations by approximately $86 million.

4.3.2 Pollution Prevention Accomplishments

The Albuquerque Operations Office reported 98 pollution prevention projects in 1998, accounting for approximately 13 percent of the waste reduction within the DOE Complex (Table 4.5). Figure 4.5 compares waste reduction by pollution prevention activity category, and Figure 4.6 compares reported cost savings/avoidance by pollution prevention activity category, for 1997 and 1998. Examples of pollution prevention projects completed in 1998 include:

- To reduce cleanup/stabilization waste, the Los Alamos National Laboratory segregates and recycles lead and steel site-wide. In June 1998, lead and steel material that had been stored for final disposition was recycled from the TA-53 accelerator facility. The material was suspect low-level mixed waste due to its origin and lead content. Since materials used at TA-53 could possibly be activated, the material was surveyed, determined to be not activated, and as a result, it was recycled. This segregation activity reduced cleanup/stabilization low-level mixed waste by approximately 338 cubic meters, for a reported cost savings/avoidance of approximately $25.5 million.

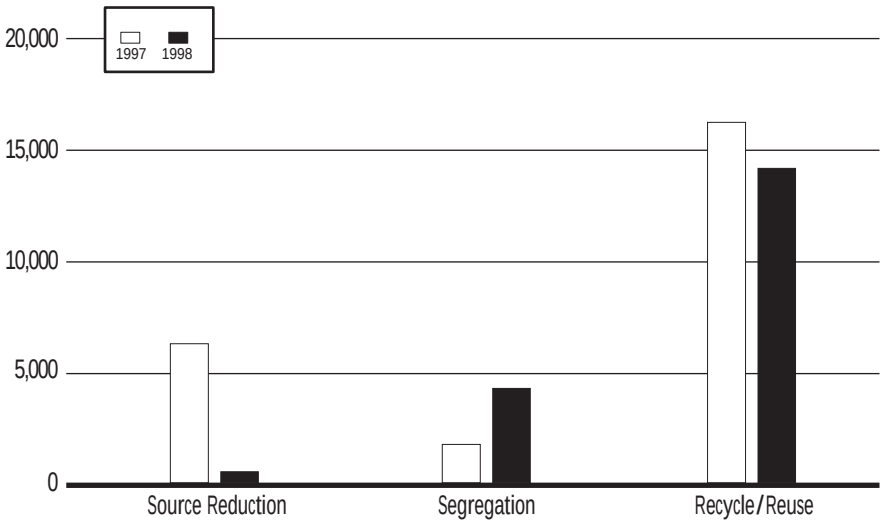


Figure 4.5
1997-1998
Albuquerque Operations Office Waste Reduction by Pollution Prevention Activity Category (in Cubic Meters)

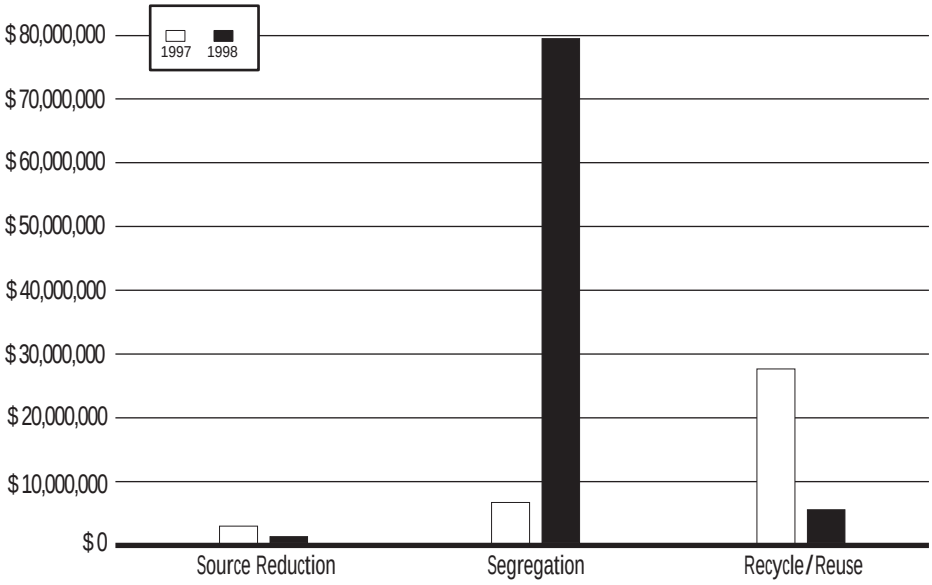


Figure 4.6
1997-1998
Albuquerque Operations Office Reported Cost Savings/Avoidance by Pollution Prevention Activity Category (in Dollars)

- At the Pantex Plant, asphalt was segregated from asphalt mixed with soil, and both materials were reused. The asphalt was used as intermediate capping material (cover for waste material) in the construction landfill, and the asphalt/soil mixture was used to repair dirt roadbeds around the construction and environmental landfills onsite. This segregation activity reduced routine operations sanitary waste by approximately 1,241 metric tons, for a reported cost savings/avoidance of $23,256.

- Sandia National Laboratories/California's Building 913 is scheduled for deconstruction/demolition, and as occupants move to smaller areas in other buildings, excess equipment is advertised on electronic bulletin boards (Material Exchange, Pollution Prevention Information Clearinghouse [EPIC], etc.) for reuse.

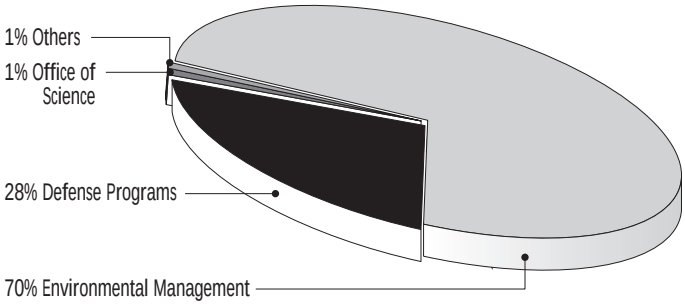
Approximately 16 pieces of equipment have been relocated. This recycle/reuse activity reduced cleanup/stabilization sanitary waste by 19 metric tons, for a reported cost savings/avoidance of approximately $1.5 million.

- An Environmental Restoration project at Los Alamos National Laboratory's TA-33 used the Segmented Gate System (SGS) in conjunction with containerized vat leaching to segregate soils. With SGS, soils move along a conveyor belt and are scanned and segregated as clean or contaminated. This segregation project reduced low-level waste by more than four cubic meters, for a reported cost savings/avoidance of $667,816.

4.3.3 Waste Generation

The total waste generated by Albuquerque Operations Office reporting sites was approximately 31,300 cubic meters in 1998, accounting for approximately seven percent of DOE's overall waste generation. Waste generated by the Albuquerque Operations Office in 1998 is primarily attributed to Defense Programs and Environmental Management (Figure 4.7).

Figure 4.7 1998 Albuquerque Operations Office Waste Generation by Program Secretarial Office



In 1998, Albuquerque Operations Office sites generated the most hazardous waste (5,300 metric tons, 35 percent) and sanitary waste (21,600 metric tons, 28 percent) within the DOE Complex (Figure 4.8). Most of the hazardous waste was generated by the Kansas City Plant, the Los Alamos National Laboratory, and the Pantex Plant due to cleanup/stabilization activities.

Most of the sanitary waste was generated by Sandia National Laboratories/New Mexico, the Kansas City Plant, and the Grand Junction Projects Office due to both routine operations and cleanup/stabilization activities.

Routine operations transuranic, low-level radioactive, and hazardous waste generation by Albuquerque Operations Office sites increased five percent (from 94 to 99 cubic meters), six percent (from 661 to 700 cubic meters), and 24 percent (from 570 to 705 metric tons), respectively, from 1997 to 1998. The increase in transuranic waste generation is due to Los Alamos National Laboratory's increase in Defense Programs activities. The increase in low-level radioactive waste generation is due to the reporting of waste generation at the Grand Junction Projects Office, which did not report in 1997. The increase in hazardous waste generation is primarily due to the Los Alamos National Laboratory's routine housekeeping.

Cleanup/stabilization transuranic, low-level mixed, and sanitary waste generation by Albuquerque Operations Office sites increased 406 percent (from eight to 42 cubic meters), 272 percent (from 158 to 588 cubic meters), and 93 percent (from 5,479 to 10,581 metric tons), respectively, from 1997 to 1998. The increase in transuranic waste generation is primarily due to cleanup activities at the Los Alamos National Laboratory,

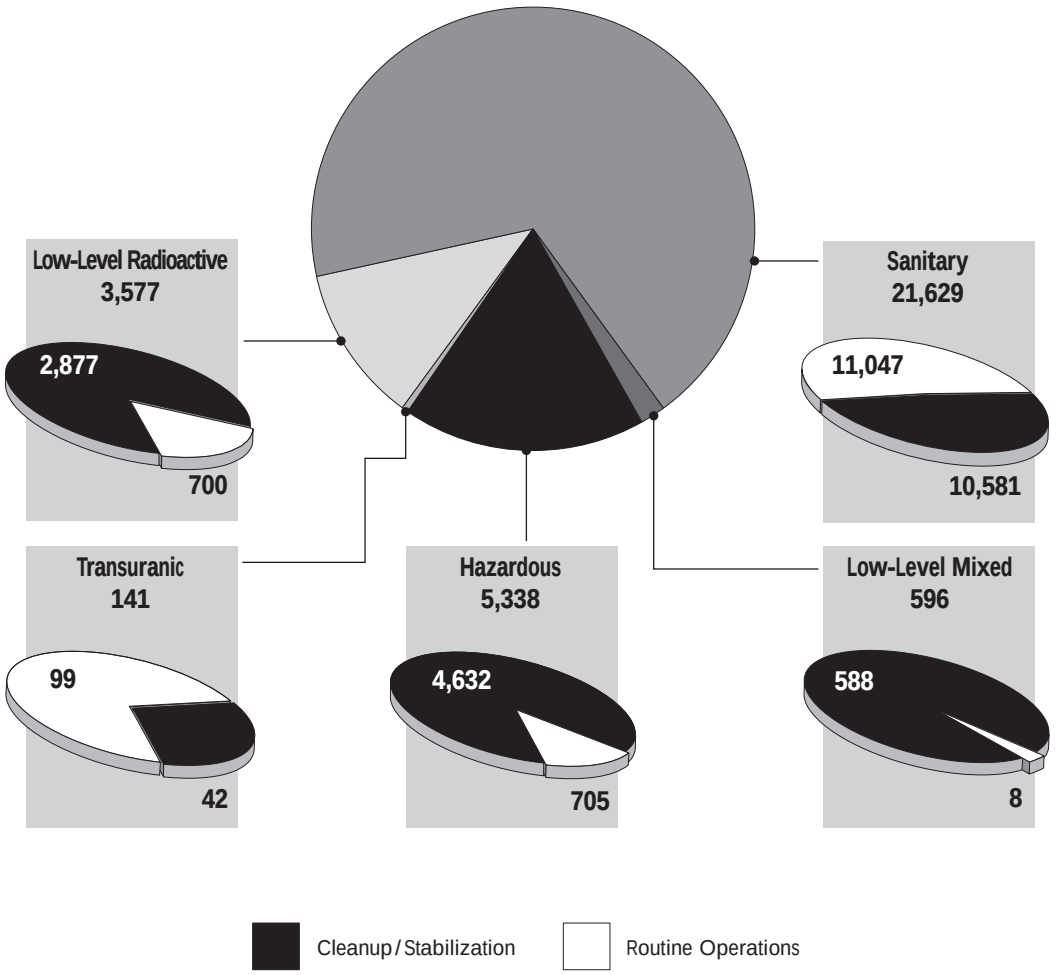


Figure 4.8
1998 Albuquerque Operations Office Waste Generation by Waste Type (in Cubic Meters)

including the cleaning of a vault to prepare for pit production. The increase in low-level mixed waste generation is primarily due to the Los Alamos National Laboratory's increased cleanup activities, and the reporting of waste generation by the Grand Junction Projects Office, which did not report in 1997. The increase in sanitary waste generation is primarily due to the Kansas City Plant's disposal of concrete and asphalt from the dismantling of a cooling tower.

Chicago Operations Office
Calendar Year 1998 Achievements

Number of Pollution Prevention Projects:	**94**
Total Waste Reduced:	**22,700 cubic meters**
Reported Cost Savings / Avoidance:	**$7.1 million**

Category	Performance Measure*	CY 99 Goal
Radioactive Waste	25% reduction	50%
Mixed Waste	95% reduction	50%
Hazardous Waste	87% reduction	50%
Sanitary Waste	53% reduction	33%
Recycling	70% recycled	33%
Affirmative Procurement	93% purchased	100%

* Performance measure comparison is from 1993 to 1998, except for recycling and affirmative procurement, for which performance is assessed annually.

Figure 4.9
1998 Chicago Operations Office Pollution Prevention Waste Reduction by Waste Category (in Cubic Meters)

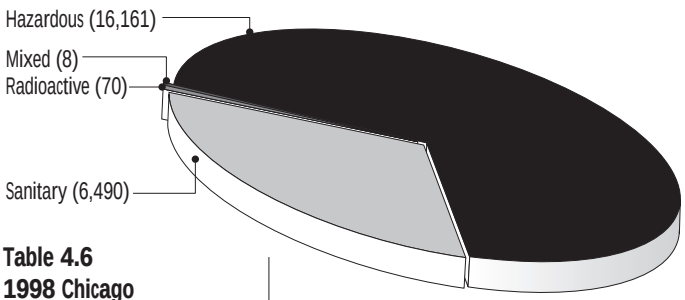


Table 4.6
1998 Chicago Operations Office Pollution Prevention Accomplishments by Site

Site Name; Location	Number of Pollution Prevention Projects	Waste Reduction (Cubic Meters)	Reported Cost Savings / Avoidance (Thousands)
Ames Laboratory; Ames, IA	1	53	$0
Argonne National Laboratory – East; Argonne, IL	20	20,587	$6,364
Argonne National Laboratory – West; Idaho Falls, ID	46	620	$149
Brookhaven National Laboratory; Upton, NY	4	334	$251
Fermi National Accelerator Laboratory; Batavia, IL	7	943	$213
Princeton Plasma Physics Laboratory; Princeton, NJ	16	192	$73.8

4.4 Chicago Operations Office

The Chicago Operations Office is responsible for energy research, development, and construction, including the administration of operating contracts for five of the nation's major government-owned laboratories.

4.4.1 Pollution Prevention Performance

In 1998, approximately 22,700 cubic meters of waste were reduced at six of the Chicago Operations Office's reporting sites through implementation of pollution prevention projects (Figure 4.9). As a result, the Chicago Operations Office reduced the cost of operations by approximately $7.1 million.

4.4.2 Pollution Prevention Accomplishments

The Chicago Operations Office reported 94 pollution prevention projects in 1998, accounting for 15 percent of the waste reduction within the DOE Complex (Table 4.6). Figure 4.10 compares waste reduction by pollution prevention activity category, and Figure 4.11 compares reported cost savings/avoidance by pollution prevention activity category, for 1997 and 1998. Examples of pollution prevention projects completed in 1998 include:

- The use of in-situ techniques to decontaminate soil eliminated a major hazardous wastestream at the Argonne National Laboratory – East. "Optimization of Enhanced Soil Mixing by Zero-Valent Ion Addition" is an enhanced soil mixing process that removes volatile organic compounds from the soil, resulting in increased removal efficiency and reduced waste volume. This segregation activity reduced cleanup/stabilization hazardous waste by approximately 15,300 metric tons, for a reported cost savings/avoidance of $6 million.

- Brookhaven National Laboratory is in the process of performing Resource Conservation and Recovery Act (RCRA) closure of the old hazardous waste

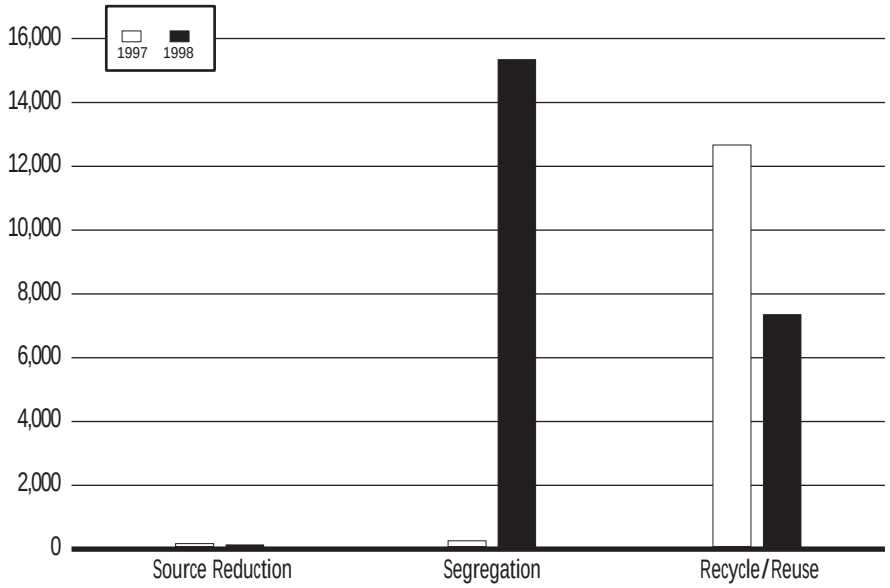


Figure 4.10 1997-1998 Chicago Operations Office Waste Reduction by Pollution Prevention Activity Category (in Cubic Meters)

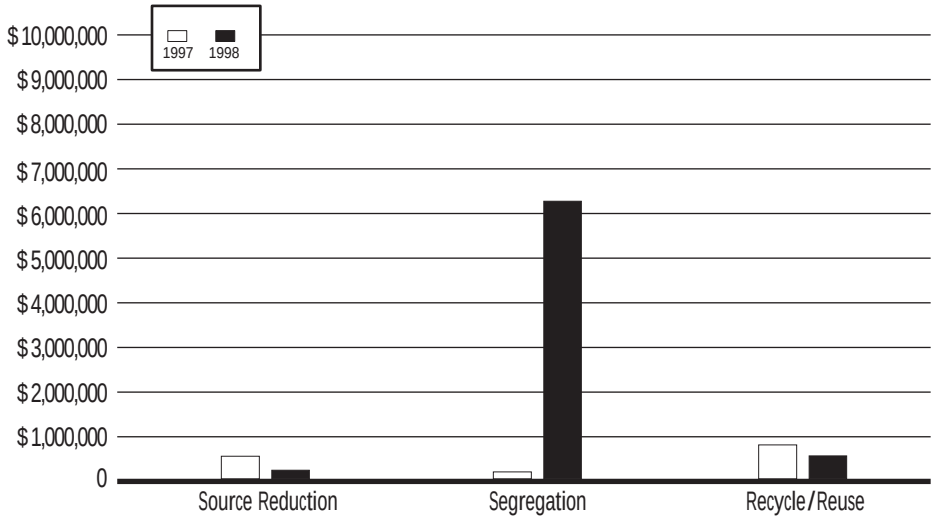


Figure 4.11 1997-1998 Chicago Operations Office Reported Cost Savings/Avoidance by Pollution Prevention Activity Category (in Dollars)

management facility. As part of that project, all mixed wastes were moved to the newly constructed waste management facility. Before the waste was moved, a detailed review of all characterization data was performed. The review resulted in the re-characterization of several wastes as non-RCRA. They were subsequently determined to be radioactive non-mixed wastes, and were segregated, treated, and disposed. Approximately 400 gallons of waste were recharacterized. This segregation project reduced low-level mixed waste by approximately two cubic meters, for a reported cost savings/avoidance of $40,000.

- At the Argonne National Laboratory – West Electron Microscopy Laboratory, a new facility just coming online, a project was undertaken to reuse a radiologically contaminated High Efficiency Particulate Air (HEPA) filter housing removed during the Analytical Laboratory upgrade. This eliminated the disposal of the used HEPA

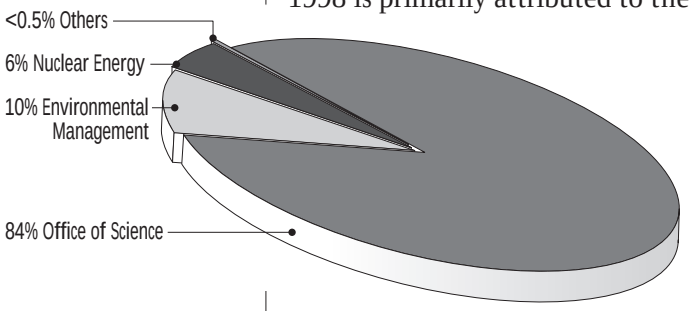
filter housing as low-level radioactive waste, and eliminated the purchase of new HEPA filter housings. This recycle/reuse activity reduced low-level radioactive waste by approximately 27 cubic meters, for a reported cost savings/avoidance of $21,000.

- At the Argonne National Laboratory – East, the Plant Facilities and Services-Utility Systems established a contract to sell its coal fines for recycling. This recycle/reuse project reduced hazardous waste by 708 metric tons, saved $28,300 in disposal costs, and revenues generated from the sale of the coal fines totaled $5,680.

4.4.3 Waste Generation

The total waste generated by Chicago Operations Office reporting sites was approximately 9,700 cubic meters in 1998, accounting for approximately two percent of DOE's overall waste generation. Waste generated by the Chicago Operations Office in 1998 is primarily attributed to the Office of Science (Figure 4.12).

Figure 4.12 1998 Chicago Operations Office Waste Generation by Program Secretarial Office



In 1998, hazardous waste generation of 4,300 metric tons accounted for 44 percent of all waste generated by Chicago Operations Office sites, and was the largest waste type generated (Figure 4.13). Most of this waste was generated by the Brookhaven National Laboratory and Fermi National Accelerator Laboratory due to cleanup/stabilization activities.

Routine operations low-level radioactive waste generation by Chicago Operations Office sites increased four percent (from 979 to 1,017 cubic meters) from 1997 to 1998. This increase is primarily due to Fermi National Accelerator Laboratory's accelerator upgrade and maintenance activities.

Cleanup/stabilization waste generation of all waste types by Chicago Operations Office sites decreased from 1997 to 1998.

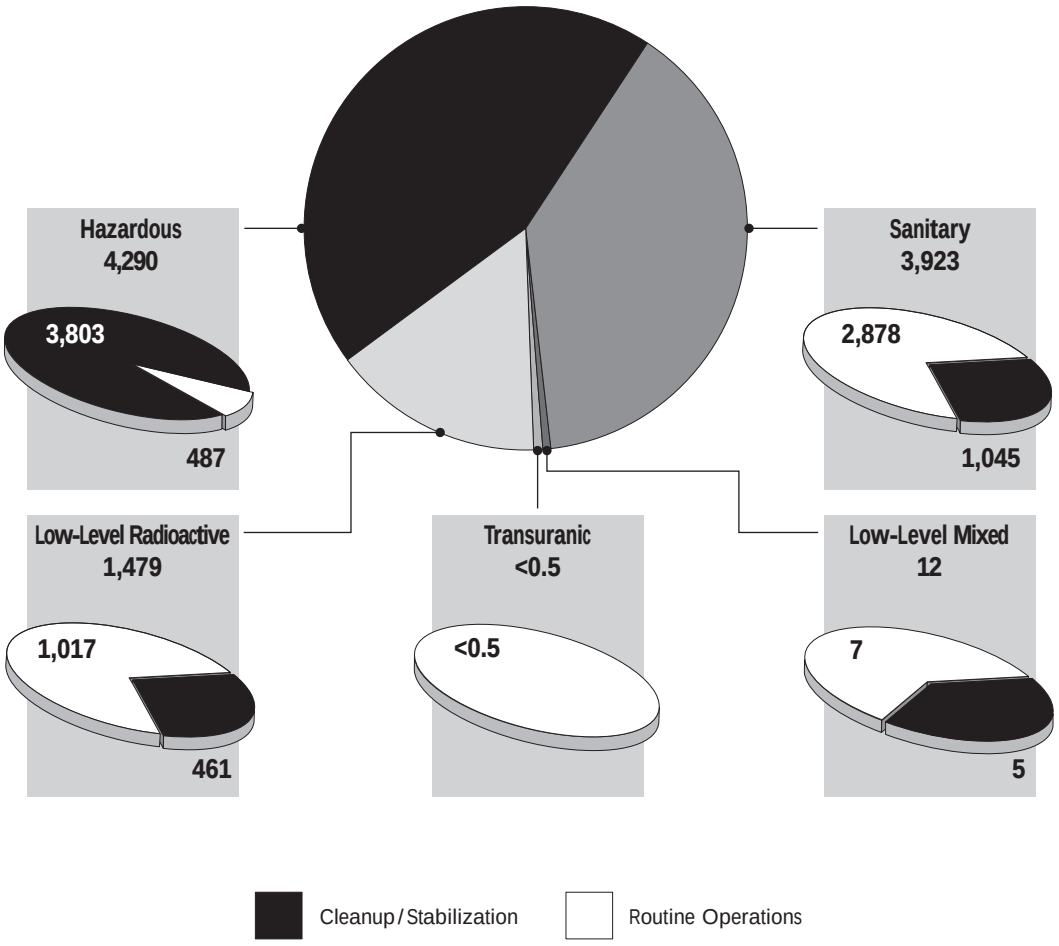


Figure 4.13
1998 Chicago Operations Office Waste Generation by Waste Type (in Cubic Meters)

Idaho Operations Office
Calendar Year 1998 Achievements

Number of Pollution Prevention Projects: **19**

Total Waste Reduced: **1,100 cubic meters**

Reported Cost Savings / Avoidance: **$9.4 million**

Category	Performance Measure*	CY 99 Goal
Radioactive Waste	59% reduction	50%
Mixed Waste	122% increase**	50%
Hazardous Waste	96% reduction	50%
Sanitary Waste	57% reduction	33%
Recycling	18% recycled	33%
Affirmative Procurement	100% purchased	100%

* Performance measure comparison is from 1993 to 1998, except for recycling and affirmative procurement, for which performance is assessed annually.

** 1993 baseline was 27 cubic meters due to a moratorium on mixed waste generation.

Figure 4.14
1998 Idaho Operations Office Pollution Prevention Waste Reduction by Waste Category (in Cubic Meters)

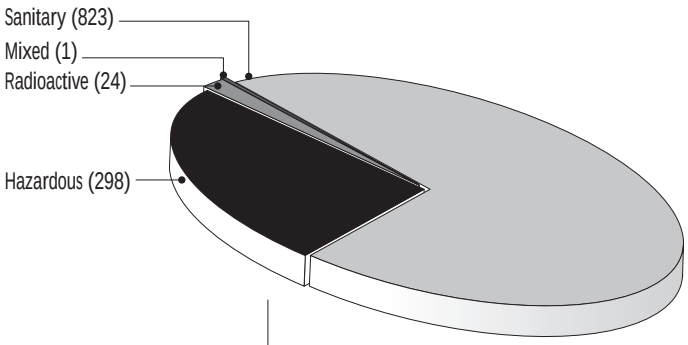


Table 4.7
1998 Idaho Operations Office Pollution Prevention Accomplishments by Site

Site Name; Location	Number of Pollution Prevention Projects	Waste Reduction (Cubic Meters)	Reported Cost Savings / Avoidance (Thousands)
Idaho National Engineering and Environmental Laboratory; Idaho Falls, ID	19	1,145	$9,410

4.5 Idaho Operations Office

The Idaho Operations Office is responsible for the administration and management of assigned programs; alternate energy technology development and demonstration projects; chemical processing operations and demonstration; environmental restoration and waste management operations; and nuclear reactor safety research, development, and demonstration.

4.5.1 Pollution Prevention Performance

In 1998, approximately 1,100 cubic meters of waste were reduced at the Idaho Operations Office's one reporting site through implementation of pollution prevention projects (Figure 4.14). As a result, the Idaho Operations Office reduced the cost of operations by $9.4 million.

4.5.2 Pollution Prevention Accomplishments

The Idaho Operations Office reported 19 pollution prevention projects in 1998, accounting for approximately one percent of the waste reduction within the DOE Complex (Table 4.7). Figure 4.15 compares waste reduction by pollution prevention activity category, and Figure 4.16 compares reported cost savings/avoidance by pollution prevention activity category, for 1997 and 1998. Examples of pollution prevention projects completed in 1998 include:

- The Idaho National Engineering and Environmental Laboratory recycled Resource Conservation and Recovery Act (RCRA) regulated hazardous materials, including lead scrap, lead acid batteries, RCRA scrap, and silver scrap. This reduced hazardous waste by 184 metric tons, for a reported cost savings/avoidance of $3.7 million.

- The Idaho National Engineering and Environmental Laboratory's engine oil is collected by a recycling vendor for energy recovery at the Ashgrove cement plant in Inkom, Idaho. This recycle/reuse activity reduced routine operations hazardous waste by approximately 55 metric tons, for a reported cost savings/avoidance of $1.1 million.

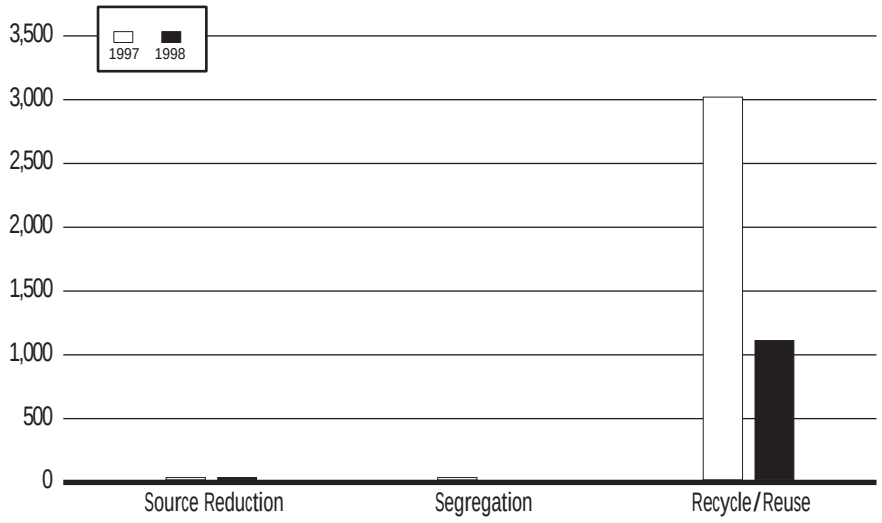


Figure 4.15 1997-1998 Idaho Operations Office Waste Reduction by Pollution Prevention Activity Category (in Cubic Meters)

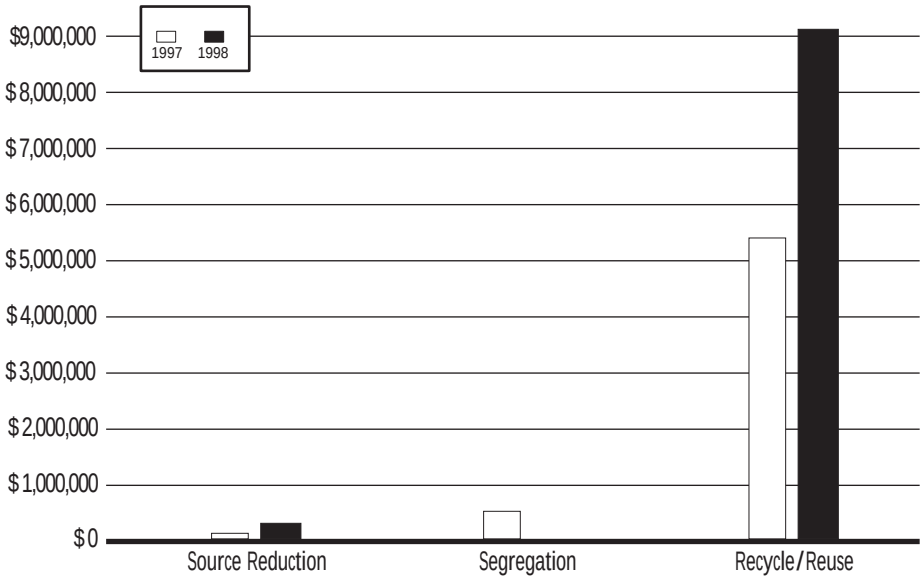


Figure 4.16 1997-1998 Idaho Operations Office Reported Cost Savings/Avoidance by Pollution Prevention Activity Category (in Dollars)

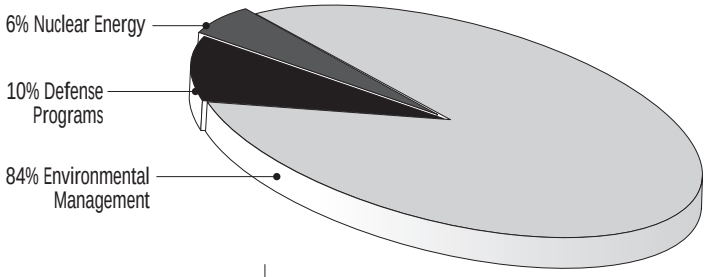
- The Mobile Test Assembly Cask was dismantled at the Idaho National Engineering and Environmental Laboratory, and the clean lead was sent to the clean lead storage area for recycling. This recycle/reuse activity reduced cleanup/stabilization hazardous waste by approximately 20 metric tons, for a reported cost savings/avoidance of $408,600.

- The Idaho National Engineering and Environmental Laboratory's Specific Manufacturing Capability (SMC) facility recycled depleted uranium scrap metal material from both normal facility operations and deactivation of a facility. These recycle/reuse activities reduced both routine operations and cleanup/stabilization low-level radioactive waste by approximately 19 cubic meters, for a reported cost savings/avoidance of $23,400.

4.5.3 Waste Generation

The total waste generated by the Idaho Operations Office's one reporting site was approximately 10,000 cubic meters in 1998, accounting for approximately two percent of DOE's overall waste generation. Waste generated by the Idaho Operations Office in 1998 is primarily attributed to Environmental Management (Figure 4.17).

Figure 4.17 1998 Idaho Operations Office Waste Generation by Program Secretarial Office



In 1998, sanitary waste generation of 6,200 metric tons accounted for 62 percent of all waste generated by the Idaho National Engineering and Environmental Laboratory (INEEL), and was the largest waste type generated (Figure 4.18). Most of this waste was generated by cleanup/stabilization activities.

Routine operations low-level mixed waste generation by INEEL increased 25 percent (from 48 to 60 cubic meters) from 1997 to 1998. This increase is primarily due to increased repackaging operations at INEEL's Mixed Waste Storage Facility.

Cleanup/stabilization transuranic waste generation by INEEL increased from zero to four cubic meters, from 1997 to 1998. Cleanup/stabilization low-level radioactive waste and low-level mixed generation increased 93 percent (from 855 to 1,648 cubic meters) and 847 percent (from 78 to 741 cubic meters), respectively, from 1997 to 1998. The increase in transuranic waste generation is due to INEEL's cleanout and repair of the New Waste Calcining Facility, and laboratory waste generated at the Idaho Nuclear Technology and Engineering Center. The increase in low-level radioactive waste generation is due to deactivation projects at the Idaho Nuclear Technology and Engineering Center. The increases in low-level mixed waste generation are due to increased cleanup/stabilization activities across INEEL, including the Auxiliary Reactor Area, Central Facility Area, Idaho Nuclear Technology and Engineering Center, INEEL Research Center, Power Burst Facility, Test Reactor Area, Test Area North, Waste Area Group 1, and the Mixed Waste Storage Facility.

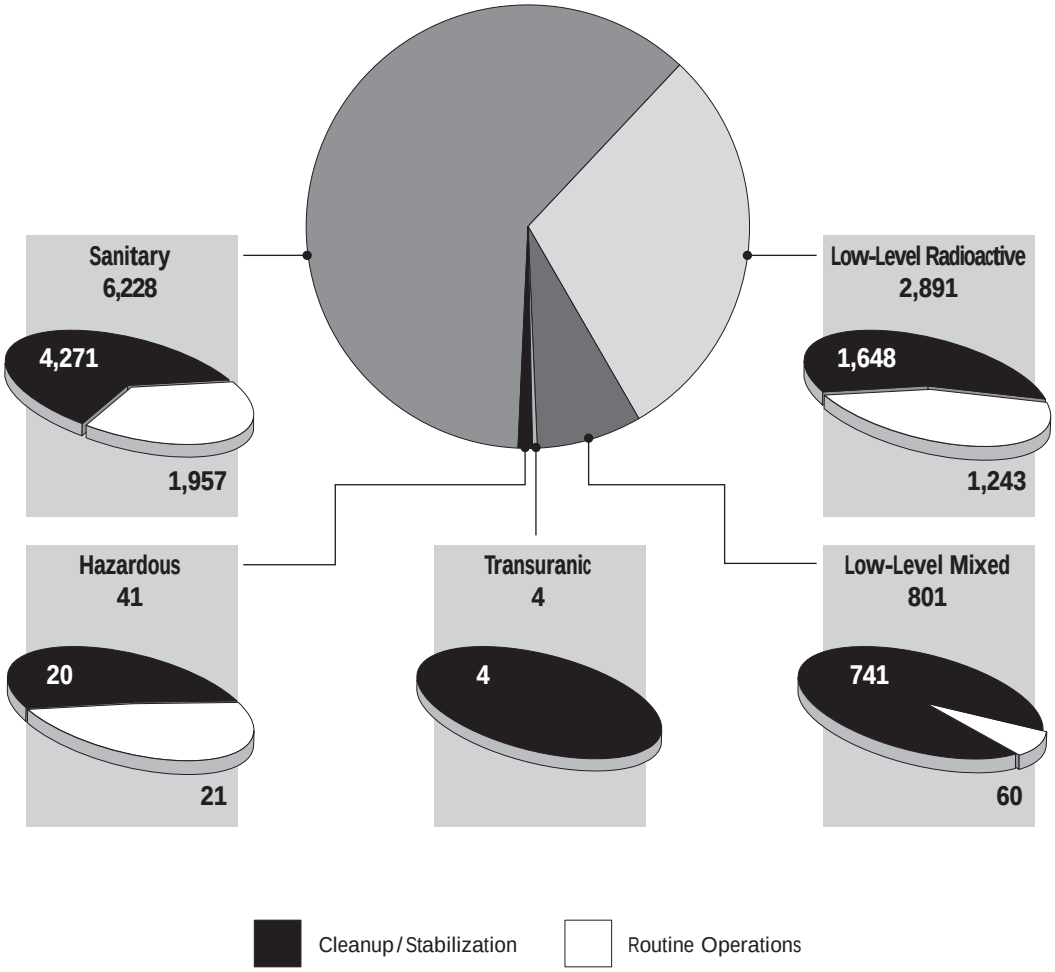


Figure 4.18
1998 Idaho Operations Office Waste Generation by Waste Type (in Cubic Meters)

Nevada Operations Office
Calendar Year 1998 Achievements

Number of Pollution Prevention Projects: **32**

Total Waste Reduced: **2,000 cubic meters**

Reported Cost Savings / Avoidance: **$892,000**

Category	Performance Measure*	CY 99 Goal
Hazardous Waste	99% reduction	50%
Sanitary Waste	53% reduction	33%
Recycling	18% recycled	33%
Affirmative Procurement	59% purchased	100%

* Performance measure comparison is from 1993 to 1998, except for recycling and affirmative procurement, for which performance is assessed annually.

Figure 4.19
1998 Nevada Operations Office Pollution Prevention Waste Reduction by Waste Category (in Cubic Meters)

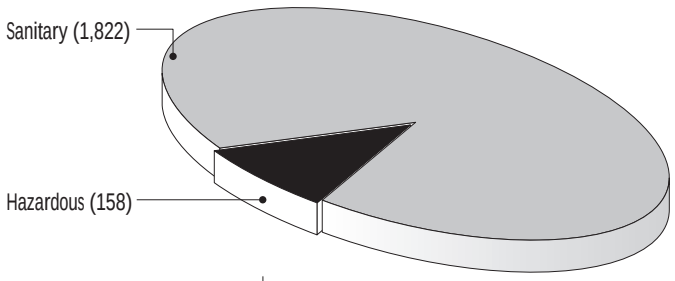


Table 4.8
1998 Nevada Operations Office Pollution Prevention Accomplishments by Site

Site Name; Location	Number of Pollution Prevention Projects	Waste Reduction (Cubic Meters)	Reported Cost Savings / Avoidance (Thousands)
Nevada Test Site*; Mercury, NV	32	1,979	$892

* Also includes North Las Vegas Facility projects.

4.6 Nevada Operations Office

The Nevada Operations Office is responsible for stewardship of the Nevada Test Site, and provides support for national security, energy efficiency and renewable energy, environmental management, and technology diversification.

4.6.1 Pollution Prevention Performance

In 1998, approximately 2,000 cubic meters of waste were reduced at the Nevada Operations Office's one reporting site through implementation of pollution prevention projects (Figure 4.19). As a result, the Nevada Operations Office reduced the cost of operations by $892,000.

4.6.2 Pollution Prevention Accomplishments

The Nevada Operations Office reported 32 pollution prevention projects in 1998, accounting for approximately one percent of the waste reduction within the DOE Complex (Table 4.8). Figure 4.20 compares waste reduction by pollution prevention activity category, and Figure 4.21 compares reported cost savings/avoidance by pollution prevention activity category, for 1997 and 1998. Examples of pollution prevention projects completed in 1998 include:

- Gasoline removed from underground storage tanks was recycled onsite at the Nevada Test Site. This recycle/reuse activity reduced cleanup/stabilization hazardous waste by approximately 39 metric tons, for a reported cost savings/avoidance of $307,120.

- At the Nevada Test Site, scrap metals (including ferrous, nonferrous, light steel, and mixed steel) were sold. This recycle/reuse project reduced sanitary waste by 1,328 metric tons, for a reported cost savings/avoidance of $135,413.

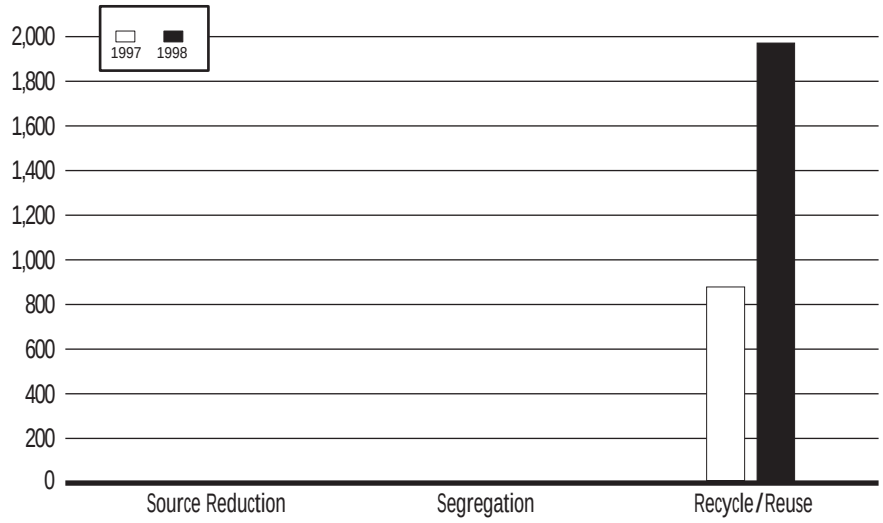


Figure 4.20 1997-1998 Nevada Operations Office Waste Reduction by Pollution Prevention Activity Category (in Cubic Meters)

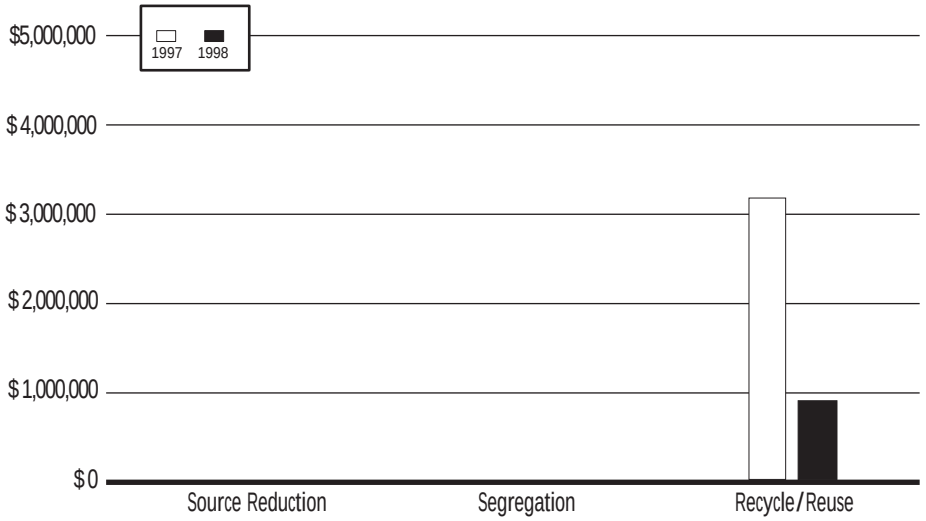


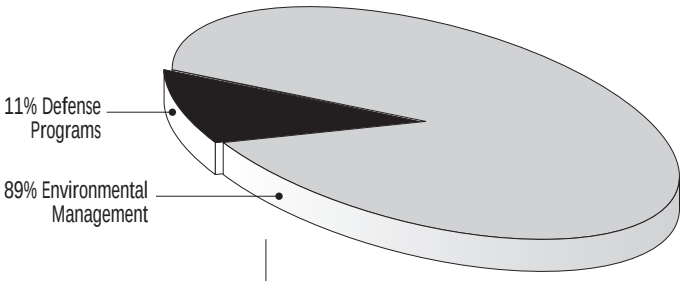
Figure 4.21 1997-1998 Nevada Operations Office Reported Cost Savings/Avoidance by Pollution Prevention Activity Category (in Dollars)

- A material and chemical exchange project at the Nevada Test Site facilitated the transfer of kerosene destined for disposal to another department for reuse. This recycle/reuse project reduced hazardous waste by three metric tons, for a reported cost savings/avoidance of $34,632.

- Naphtha solvent and DTE 105 compressor oil were transferred from the Nevada Test Site to the Naval Petroleum and Oil Reserves in Casper, Wyoming as a materials exchange project. This recycle/reuse activity reduced cleanup/stabilization hazardous waste by approximately two metric tons, for a reported cost savings/avoidance of $33,670.

4.6.3 Waste Generation

Figure 4.22 1998 Nevada Operations Office Waste Generation by Program Secretarial Office



The total waste generated by Nevada Operations Office reporting sites was approximately 9,000 cubic meters in 1998, accounting for approximately two percent of DOE's overall waste generation. Waste generated by the Nevada Operations Office in 1998 is primarily attributed to Environmental Management (Figure 4.22).

In 1998, sanitary waste generation of 8,100 metric tons accounted for 90 percent of all waste generated by Nevada Operations Office sites, and was the largest waste type generated (Figure 4.23). Most of this waste was generated at the Nevada Test Site due to routine operations activities.

Routine operations hazardous and sanitary waste generation by the Nevada Operations Office sites increased 356 percent (from 11 to 50 metric tons) and 184 percent (from 2,278 to 6,461 metric tons), respectively, from 1997 to 1998. The increase in hazardous waste generation is primarily due to the Nevada Test Site's aggressive environmental restoration projects and its disposal of 2,000 gallons of used oil. The increase in sanitary waste generation is primarily due to the Nevada Test Site's new testing projects and business development activities, increased food waste generated by cafeterias, generation by outside agencies performing exercises at the site, the construction of new facilities, and the closure of 450 buildings at the site.

Cleanup/stabilization low-level mixed, hazardous, and sanitary waste generation by Nevada Operations Office sites increased more than 9,500 percent (from three to 263 cubic meters), 76 percent (from 10 to 18 metric tons), and 3,400 percent (from 47 to 1,647 metric tons), respectively, from 1997 to 1998. The increase in low-level mixed waste generation is due to the Nevada Test Site's remediation of the Building 650 Leachfield. The increases in hazardous and sanitary waste generation are due to the Nevada Test Site's accelerated schedule for environmental restoration field projects based on the Federal Facility Agreement and Consent Order.

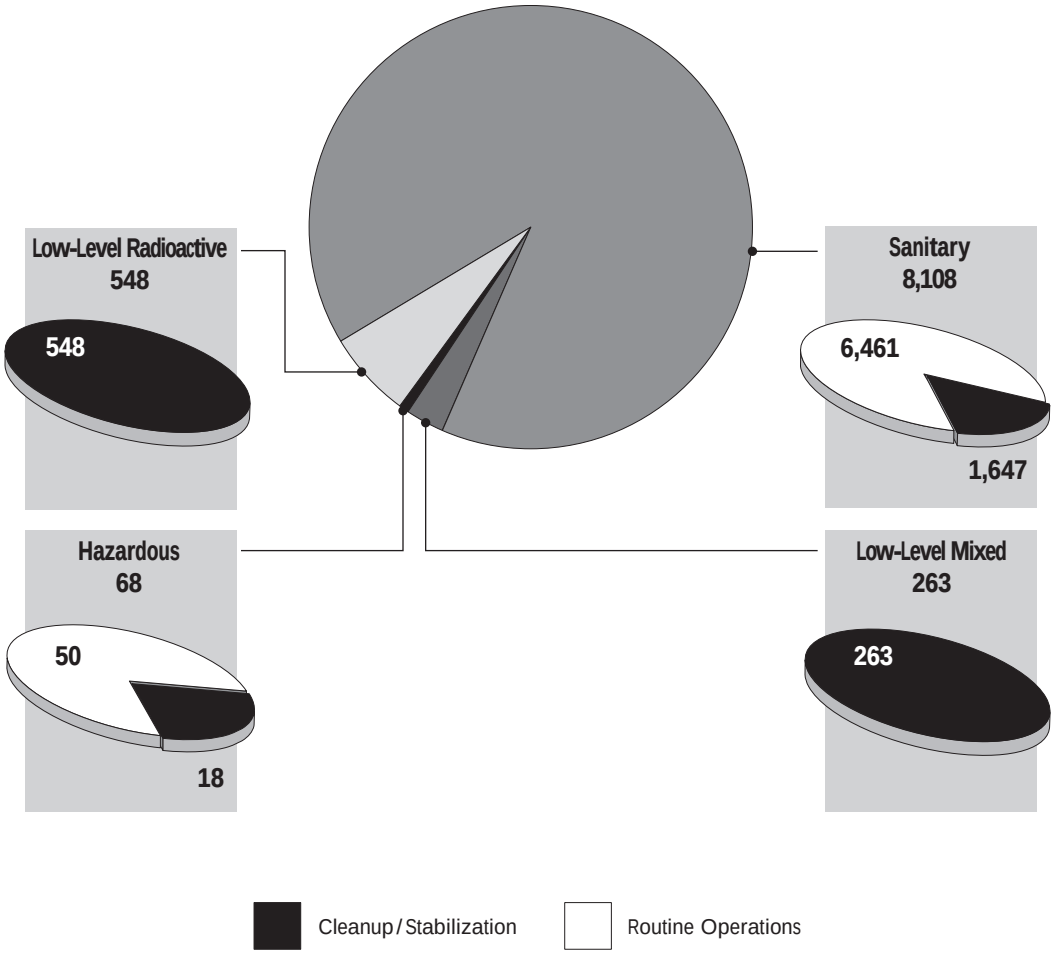


Figure 4.23
1998 Nevada Operations Office Waste Generation by Waste Type (in Cubic Meters)

Oakland Operations Office
Calendar Year 1998 Achievements

Number of Pollution Prevention Projects:	**17**
Total Waste Reduced:	**2,100 cubic meters**
Reported Cost Savings / Avoidance:	**$3.4 million**

Category	Performance Measure*	CY 99 Goal
Radioactive Waste	13% increase	50%
Mixed Waste	5% reduction	50%
Hazardous Waste	62% reduction	50%
Sanitary Waste	68% reduction	33%
Recycling	62% recycled	33%
Affirmative Procurement	98% purchased	100%

* Performance measure comparison is from 1993 to 1998, except for recycling and affirmative procurement, for which performance is assessed annually.

Figure 4.24
1998 Oakland Operations Office Pollution Prevention Waste Reduction by Waste Category (in Cubic Meters)

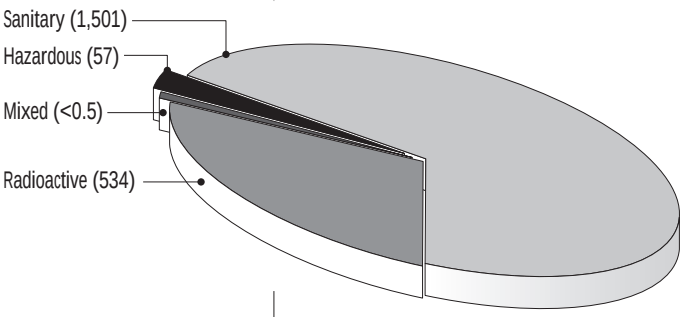


Table 4.9
1998 Oakland Operations Office Pollution Prevention Accomplishments by Site*

Site Name; Location	Number of Pollution Prevention Projects	Waste Reduction (Cubic Meters)	Reported Cost Savings / Avoidance (Thousands)
Energy Technology Engineering Center; Canoga Park, CA	6	1,557	$1,078
Lawrence Berkeley National Laboratory; Berkeley, CA	11	536	$2,303

* Sites that did not report pollution prevention projects in 1998 are not included in this table.

4.7 Oakland Operations Office

The Oakland Operations Office serves the public by managing world-class national research and development facilities, including the administration of operating contracts for the nation's government-owned laboratories and facilities.

4.7.1 Pollution Prevention Performance

In 1998, approximately 2,100 cubic meters of waste were reduced at two of the Oakland Operations Office's reporting sites through implementation of pollution prevention projects (Figure 4.24). As a result, the Oakland Operations Office reduced the cost of operations by approximately $3.4 million.

4.7.2 Pollution Prevention Accomplishments

The Oakland Operations Office reported 17 pollution prevention projects in 1998, accounting for approximately one percent of the waste reduction within the DOE Complex (Table 4.9). Figure 4.25 compares waste reduction by pollution prevention activity category, and Figure 4.26 compares reported cost savings/avoidance by pollution prevention activity category, for 1997 and 1998. Examples of pollution prevention projects completed in 1998 include:

- Lightly activated concrete shielding blocks at the Lawrence Berkeley National Laboratory were shipped to the Brookhaven National Laboratory for reuse in the Relativistic Heavy Ion Collider. This recycle/reuse activity reduced cleanup/stabilization low-level radioactive waste by 371 cubic meters, for a reported cost savings/avoidance of $1.4 million.

- A total of 278 clean concrete blocks (each weighing up to 20,000 pounds) from the decommissioning of Building 20 at the Energy Technology Engineering Center were shipped to a state-licensed site adjacent to the Santa Clara River for use as fill for the construction of flood control levees. This recycle/reuse activity reduced

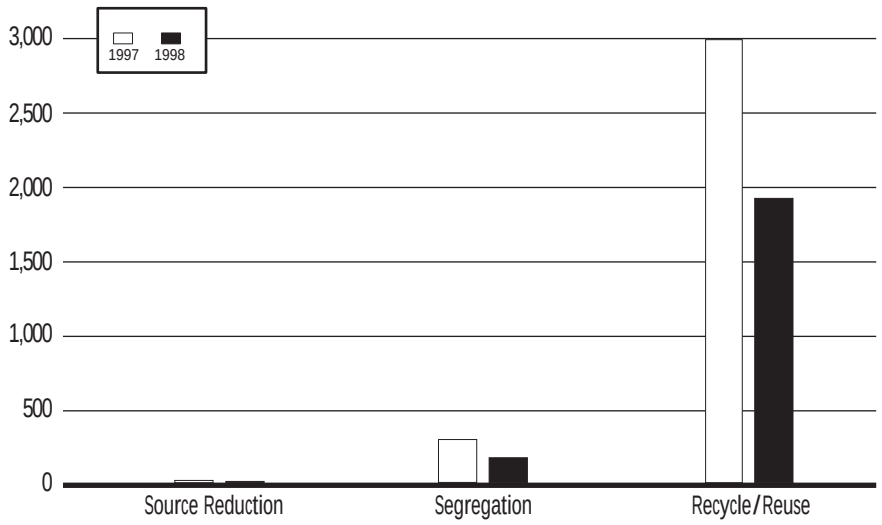


Figure 4.25 1997-1998 Oakland Operations Office Waste Reduction by Pollution Prevention Activity Category (in Cubic Meters)

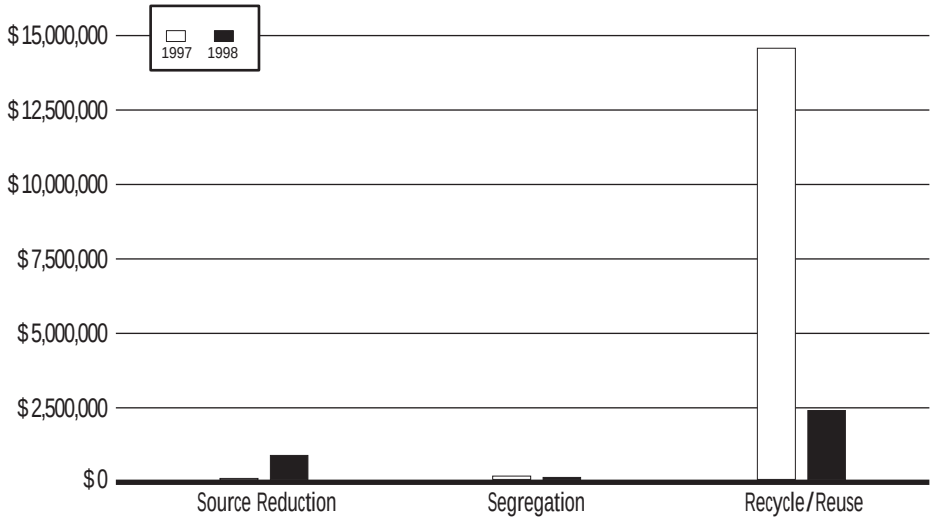


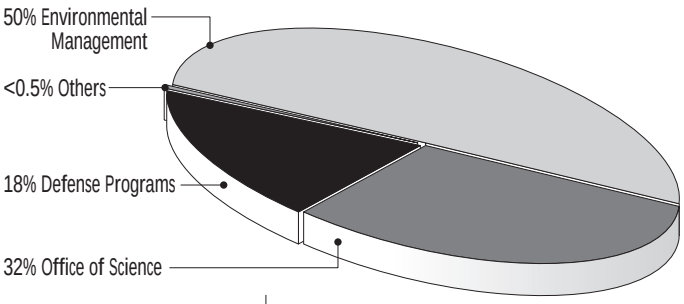
Figure 4.26 1997-1998 Oakland Operations Office Reported Cost Savings/Avoidance by Pollution Prevention Activity Category (in Dollars)

cleanup/stabilization sanitary waste by approximately 1,461 metric tons, for a reported cost savings/avoidance of $302,000.

4.7.3 Waste Generation

The total waste generated by Oakland Operations Office reporting sites was approximately 11,500 cubic meters in 1998, accounting for approximately three percent of DOE's overall waste generation total. Waste generation by the Oakland Operations Office in 1998 is primarily attributed to Environmental Management and the Office of Science (Figure 4.27).

Figure 4.27
1998 Oakland Operations Office Waste Generation by Program Secretarial Office



In 1998, sanitary waste generation of 7,100 metric tons accounted for 61 percent of all waste generated by Oakland Operations Office sites, and was the largest waste type generated (Figure 4.28). Most of this waste was generated at the Lawrence Livermore National Laboratory due to routine operations and cleanup/stabilization activities.

Routine operations low-level radioactive, low-level mixed, and hazardous waste generation by Oakland Operations Office sites increased 167 percent (from 83 to 222 cubic meters), 368 percent (from 20 to 94 cubic meters), and 13 percent (from 321 to 362 metric tons), respectively, from 1997 to 1998. The increase in low-level radioactive waste generation is primarily due to Lawrence Livermore National Laboratory's expanded Defense Programs projects. The increase in low-level mixed waste generation is primarily due to the Lawrence Livermore National Laboratory's processing of liquid waste at the Hazardous Waste Management facility, generating increased quantities of filter cake. The increase in hazardous waste generation is primarily due to the Lawrence Livermore National Laboratory's additional analytical activities in the Biology and Biotechnology Research Directorate.

Cleanup/stabilization low-level radioactive and sanitary waste generation by Oakland Operations Office sites increased 18 percent (from 1,897 to 2,243 cubic meters) and 23 percent (from 3,016 to 3,695 metric tons), respectively, from 1997 to 1998. The increase in low-level radioactive waste generation is primarily due to the Energy Technology Engineering Center's deactivation and decommissioning activities. The increase in sanitary waste generation is primarily due to the Lawrence Livermore National Laboratory's non-routine cleanup activities.

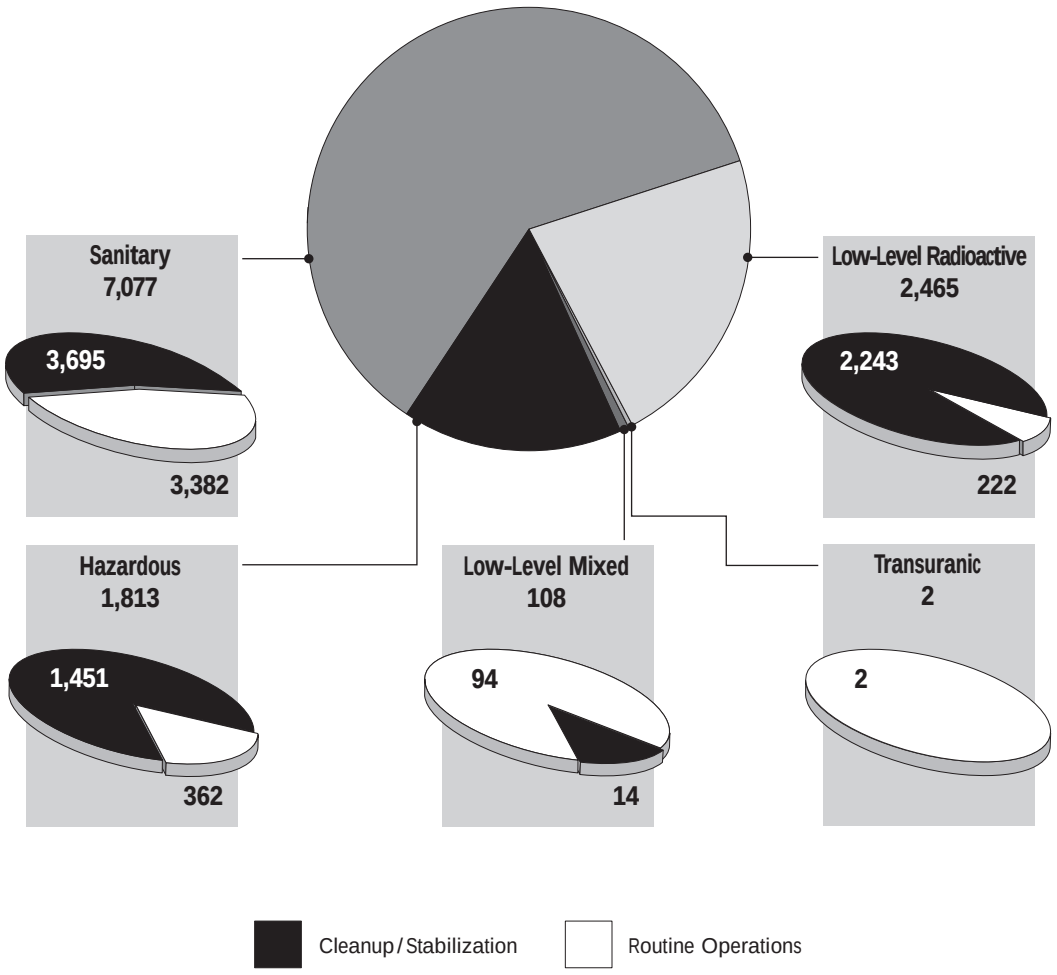


Figure 4.28
1998 Oakland Operations Office Waste Generation by Waste Type (in Cubic Meters)

Oak Ridge Operations Office
Calendar Year 1998 Achievements

Number of Pollution Prevention Projects:	**111**
Total Waste Reduced:	**64,900 cubic meters**
Reported Cost Savings / Avoidance:	**$22.7 million**

Category	Performance Measure*	CY 99 Goal
Radioactive Waste	67% reduction	50%
Mixed Waste	80% reduction	50%
Hazardous Waste	25% reduction	50%
Sanitary Waste	69% reduction	33%
Recycling	63% recycled	33%
Affirmative Procurement	72% purchased	100%

* Performance measure comparison is from 1993 to 1998, except for recycling and affirmative procurement, for which performance is assessed annually.

Figure 4.29
1998 Oak Ridge Operations Office Pollution Prevention Waste Reduction by Waste Category (in Cubic Meters)

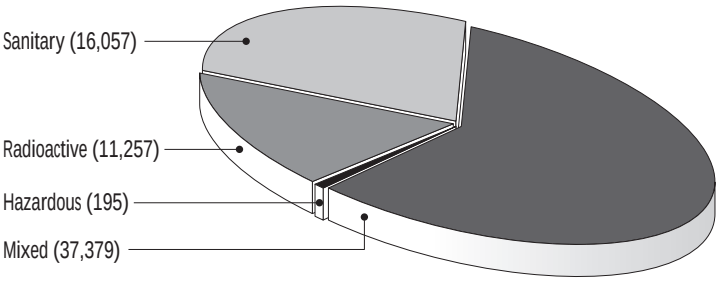


Table 4.10
1998 Oak Ridge Operations Office Pollution Prevention Accomplishments by Site*

Site Name; Location	Number of Pollution Prevention Projects*	Waste Reduction (Cubic Meters)	Reported Cost Savings / Avoidance (Thousands)
East Tennessee Technology Park; Oak Ridge, TN	46	11,019	$5,287
Oak Ridge National Laboratory; Oak Ridge, TN	24	40,290	$14,566
Oak Ridge Y-12 Plant; Oak Ridge, TN	29	11,127	$2,429
Paducah Gaseous Diffusion Plant; Paducah, KY	8	1,567	$281
Portsmouth Gaseous Diffusion Plant; Piketon, OH	4	885	$112

* Sites that did not report pollution prevention projects in 1998 are not included in this table.

4.8 Oak Ridge Operations Office

The Oak Ridge Operations Office provides weapons component dismantlement, maintains the nation's inventory of enriched uranium and lithium, conducts a diversified research and development program on a variety of energy technologies, performs environmental management activities, oversees nuclear safety for enrichment facilities, and provides technical assistance training.

4.8.1 Pollution Prevention Performance

In 1998, approximately 64,900 cubic meters of waste were reduced at five of the Oak Ridge Operations Office's reporting sites through implementation of pollution prevention projects (Figure 4.29). As a result, the Oak Ridge Operations Office reduced the cost of operations by $22.7 million.

4.8.2 Pollution Prevention Accomplishments

The Oak Ridge Operations Office reported 111 pollution prevention projects in 1998, accounting for approximately 44 percent of the waste reduction within the DOE Complex (Table 4.10). Figure 4.30 compares waste reduction by pollution prevention activity category, and Figure 4.31 compares reported cost savings/avoidance by pollution prevention activity category, for 1997 and 1998. Examples of pollution prevention projects completed in 1998 include:

- At the East Tennessee Technology Park, pollution prevention incentives in contracts for projects include delivery of vacant and decontaminated buildings to DOE Oak Ridge Operations. This recycle/reuse activity reduced cleanup/stabilization low-level radioactive waste by approximately 395 cubic meters, low-level mixed waste by approximately 119 cubic meters, and hazardous waste by approximately 83 metric tons, for a total reported cost savings/avoidance of approximately $2.6 million.

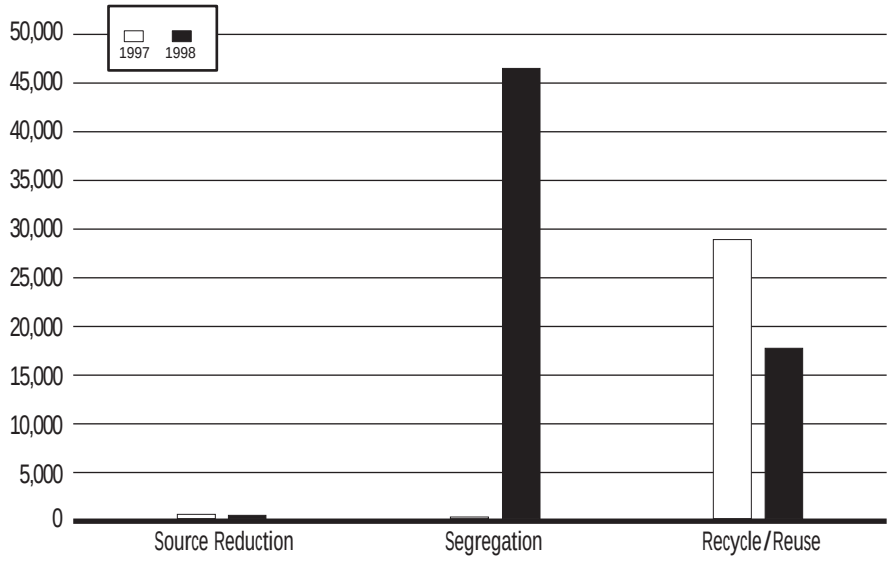


Figure 4.30
1997-1998 Oak Ridge Operations Office Waste Reduction by Pollution Prevention Activity Category (in Cubic Meters)

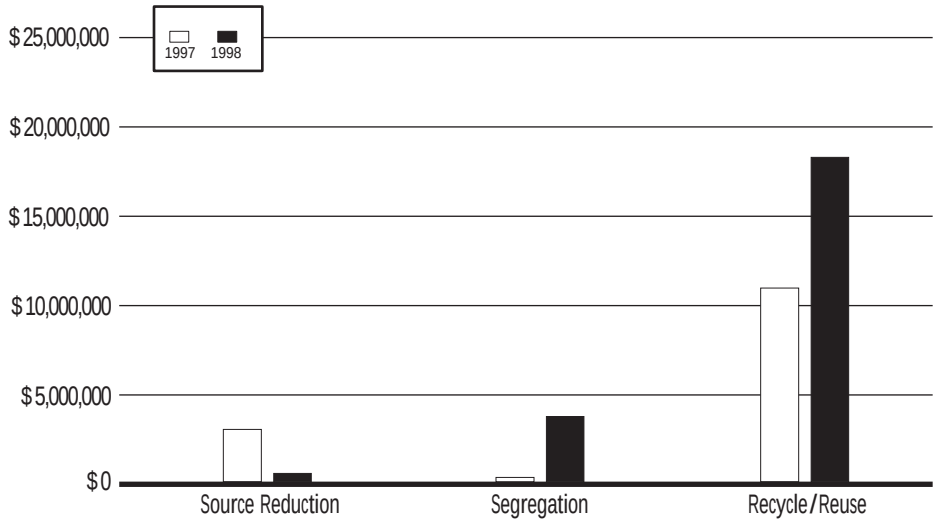


Figure 4.31
1997-1998 Oak Ridge Operations Office Reported Cost Savings/Avoidance by Pollution Prevention Activity Category (in Dollars)

- As a major part of a cleanup/cleanout campaign underway for Oak Ridge National Laboratory (ORNL) facilities located at the Oak Ridge Y-12 Plant, various scrap metals (including clean and contaminated carbon steel and copper) were sold to an outside vendor for cleaning and recycling. This eliminated the need to transfer the scrap to facilities near the main ORNL facilities complex, as well as the associated transportation costs. Costs recovered from the sale are used to continue the cleanup/cleanout effort. This recycle/reuse activity reduced routine operations low-level mixed waste by approximately 693 cubic meters, for a reported cost savings/avoidance of $292,722.

- At the Paducah Gaseous Diffusion Plant, a source reduction activity that used the direct push method for soil sampling reduced cleanup/stabilization low-level mixed

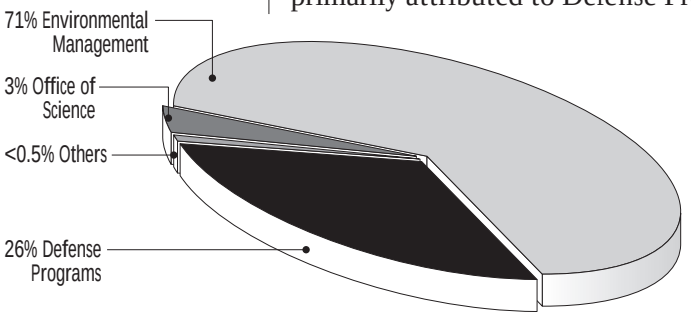
waste by approximately 114 cubic meters, for a reported cost savings/avoidance of $23,500.

- At the Oak Ridge National Laboratory, several gloveboxes in the Chemical and Analytical Sciences Division (CASD) Transuranic Research Laboratory use oil diffusion systems to ensure an inert atmosphere for work with transuranic (TRU) Isotopes. CASD replaced three oil-lubricated vacuum pumps with dry pumps, which eliminated the TRU-contaminated waste oil stream. The former pumps generated almost 20 liters per year of TRU-contaminated oil, and frequently leaked oil, which generated contaminated rags, solvents, and related materials from remediation. In addition, maintenance procedures presented the potential for personal exposure to contamination and/or radiation, and interrupted ongoing research activities. This source reduction project reduced transuranic waste by less than one cubic meter (20 liters per year), for a reported cost savings/avoidance of $11,658.

4.8.3 Waste Generation

The total waste generated by Oak Ridge Operations Office reporting sites was approximately 25,100 cubic meters in 1998, accounting for six percent of DOE's overall waste generation. Waste generated by the Oak Ridge Operations Office in 1998 is primarily attributed to Defense Programs and Environmental Management (Figure 4.32).

Figure 4.32 1998 Oak Ridge Operations Office Waste Generation by Program Secretarial Office



In 1998, Oak Ridge Operations Office sites generated the most low-level mixed waste (2,700 cubic meters, 44 percent) within the DOE Complex (Figure 4.33). Most of the low-level mixed waste was generated by the Oak Ridge Y-12 Plant and East Tennessee Technology Park due to cleanup/ stabilization activities.

Routine operations low-level radioactive and hazardous waste generation by Oak Ridge Operations Office sites increased nine percent (from 2,431 to 2,651 cubic meters) and 12 percent (from 47 to 52 metric tons), respectively, from 1997 to 1998. The increase in low-level radioactive waste generation is primarily due to Oak Ridge Y-12 Plant's equipment removal, maintenance, and Defense Programs activities. The increase in hazardous waste generation is primarily due to the Oak Ridge Y-12 Plant's generation of elevator pit oil, and the reporting of waste generation at the Thomas Jefferson National Accelerator Facility, the Office of Science and Technical Information, and the Oak Ridge Institute for Science and Education, all of which did not report in 1997. Hazardous waste generation also increased due to continued segregation efforts in which low-level mixed waste reduction has led to an increase in hazardous waste generation.

Cleanup/stabilization transuranic, low-level mixed, and hazardous waste generation by Oak Ridge Operations Office sites increased 1,058 percent (from less than one to three cubic meters), 104 percent (from 1,159 to 2,365 cubic meters), and 1,021 percent (from 119 to 1,334 metric tons), respectively, from 1997 to 1998. The increase in transuranic waste generation is due to the Oak Ridge National Laboratory's slight increase in

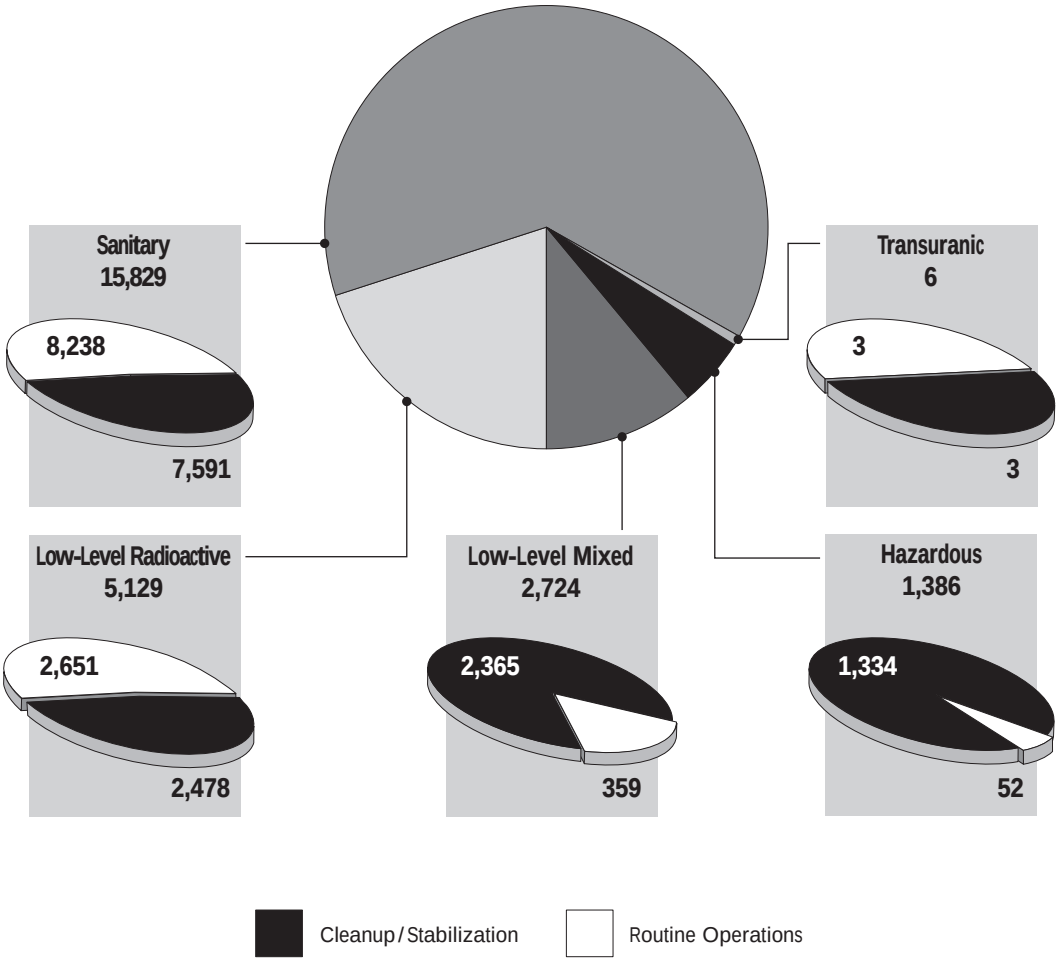


Figure 4.33
1998 Oak Ridge Operations Office Waste Generation by Waste Type (in Cubic Meters)

cleanup/stabilization activities. The increase in low-level mixed waste generation is primarily due to the Oak Ridge Y-12 Plant's demolition of Building 9825, draining and/or replacement of transformer oil, and the sludge removal project at the West End Treatment Facility; and East Tennessee Technology Park's Group I Building Demolition Project, deactivation and decommissioning activities at Buildings K-33, K-1401, K-1420, and K-1421, and the removal of sediments from groundwater infiltration of the K-1420 sumps. The increase in hazardous waste generation is due to the Oak Ridge Y-12 Plant's cleanup of lead contaminated soil at the firing range.

Ohio Field Office
Calendar Year 1998 Achievements

Number of Pollution Prevention Projects: **46**

Total Waste Reduced: **1,900 cubic meters**

Reported Cost Savings / Avoidance: **$2.6 million**

Category	Performance Measure*	CY 99 Goal
Radioactive Waste	88% reduction	50%
Mixed Waste	16% increase	50%
Hazardous Waste	69% reduction	50%
Sanitary Waste	80% reduction	33%
Recycling	30% recycled	33%
Affirmative Procurement	93% purchased	100%

* Performance measure comparison is from 1993 to 1998, except for recycling and affirmative procurement, for which performance is assessed annually.

Figure 4.34
1998 Ohio Field Office Pollution Prevention Waste Reduction by Waste Category (in Cubic Meters)

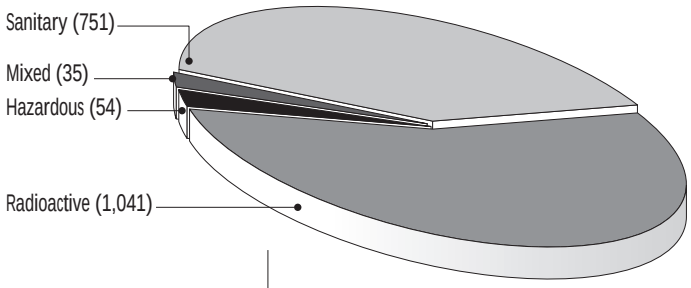


Table 4.11
1998 Ohio Field Office Pollution Prevention Accomplishments by Site

Site Name; Location	Number of Pollution Prevention Projects	Waste Reduction (Cubic Meters)	Reported Cost Savings / Avoidance (Thousands)
Battelle Columbus Laboratories; Columbus, OH	7	722	$1,286
Fernald Environmental Management Project; Fernald, OH	12	466	$666
Mound Plant; Miamisburg, OH	4	117	$5
RMI Environmental Services; Ashtabula, OH	1	8	$13
West Valley Demonstration Project; West Valley, NY	22	568	$613

4.9 Ohio Field Office

The Ohio Field Office provides administrative, financial, and technical support to Area Offices, allowing the Area Offices to complete their environmental restoration, waste management, and economic development activities in support of DOE's Complex-Wide Waste Reduction Goals.

4.9.1 Pollution Prevention Performance

In 1998, approximately 1,900 cubic meters of waste were reduced at the Ohio Field Office's five reporting sites through implementation of pollution prevention projects (Figure 4.34). As a result, the Ohio Field Office reduced the cost of operations by approximately $2.6 million.

4.9.2 Pollution Prevention Accomplishments

The Ohio Field Office reported 46 pollution prevention projects in 1998, accounting for approximately one percent of the waste reduction within the DOE Complex (Table 4.11). Figure 4.35 compares waste reduction by pollution prevention activity category, and Figure 4.36 compares reported cost savings/avoidance by pollution prevention activity category, for 1997 and 1998. Examples of pollution prevention projects completed in 1998 include:

- At the Battelle Columbus Laboratories, approximately 18,515 cubic feet of soil, water, and hard trash were segregated, characterized, and radiologically free-released for municipal disposal. This segregation project reduced low-level radioactive waste by 524 cubic meters, for a reported cost savings/avoidance of $340,796.

- The Fernald Environmental Management Project implemented a program to replace cardboard boxes with reusable plastic containers to store and transport reconditioned respirators. This source reduction activity reduced routine

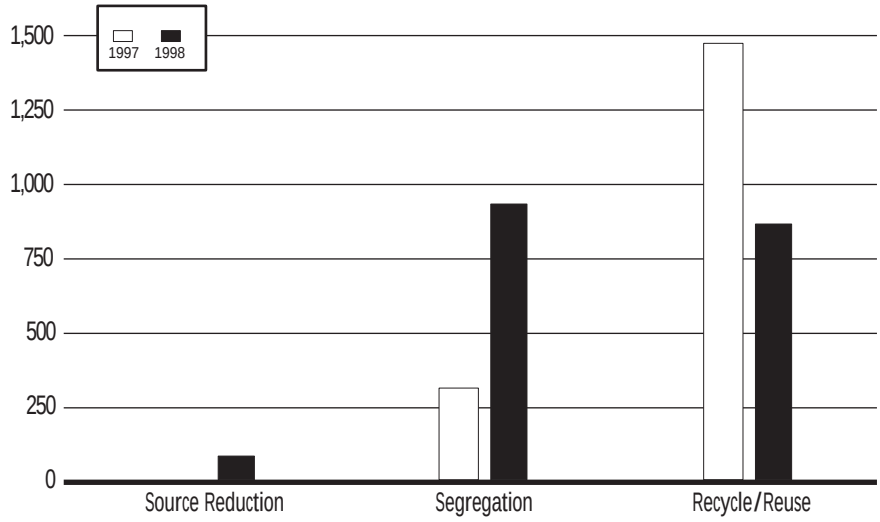


Figure 4.35
1997-1998 Ohio Field Office Waste Reduction by Pollution Prevention Activity Category (in Cubic Meters)

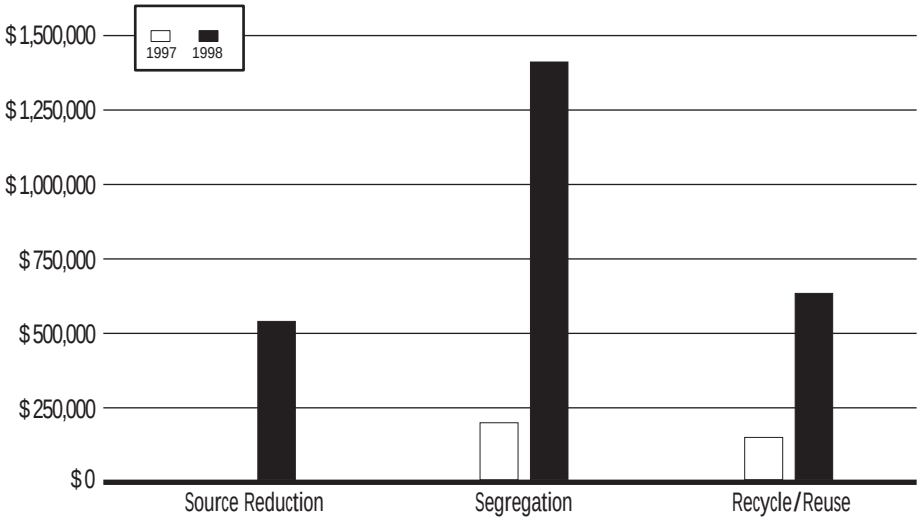


Figure 4.36
1997-1998 Ohio Field Office Reported Cost Savings/Avoidance by Pollution Prevention Activity Category (in Dollars)

operations low-level radioactive waste by approximately 21 cubic meters, for a reported cost savings/avoidance of $37,390.

- At the Mound Plant, ferrous and non-ferrous metals were collected from various construction sites and shutdown projects (including excess office equipment that was too damaged for resale). This recycle/reuse activity reduced cleanup/stabilization sanitary waste by approximately 91 metric tons, for a reported cost savings/avoidance of approximately $4,449.

- At the West Valley Demonstration Project, scrap carbon steel and stainless steel were collected and sold to a metal recycling vendor, which reduced routine operations sanitary waste by 23 metric tons, for a reported cost savings/avoidance of $1,552.

4.9.3 Waste Generation

The total waste generated by Ohio Field Office reporting sites was approximately 311,800 cubic meters in 1998, accounting for approximately 68 percent of DOE's overall waste generation. Waste generated by the Ohio Field Office in 1998 is attributed entirely to Environmental Management.

In 1998, Ohio Field Office sites generated the most low-level radioactive waste within the DOE Complex (308,500 cubic meters, 87 percent; Figure 4.37). Most of this waste was generated by the Fernald Environmental Management Project due to cleanup/stabilization activities.

Routine operations waste generation of all waste types by Ohio Field Office sites decreased from 1997 to 1998.

Cleanup/stabilization low-level radioactive, low-level mixed, and sanitary waste generation by Ohio Field Office sites increased 578 percent (from 45,376 to 307,795 cubic meters), 309 percent (from 17 to 71 cubic meters), and 59 percent (from 1,378 to 2,195 metric tons), respectively, from 1997 to 1998. Cleanup/stabilization hazardous waste generation increased from zero to 79 metric tons from 1997 to 1998. The increase in low-level radioactive waste generation is due to the Fernald Environmental Management Project's safe shutdown activities; demolition of the Plant 9 Complex and Plant 2/3; the Neutralization, Precipitation, Deactivation, and Stabilization Project; and placement of soil and debris into the newly opened on site disposal facility. The increase in low-level mixed waste generation is primarily due to Fernald Environmental Management Project's resumption of shipments for the mixed waste bulking project. The increase in hazardous waste generation is due to Mound Plant's Comprehensive Environmental Response, Compensation, and Liability Act remedial actions and asbestos removal; and the Fernald Environmental Management Project's Vitrification projects, Inoperable Unit 4 cleanup, and safe shutdown activities. The increase in sanitary waste generation is primarily due to the Mound Plant's disposal of bricks, concrete, and other demolition debris.

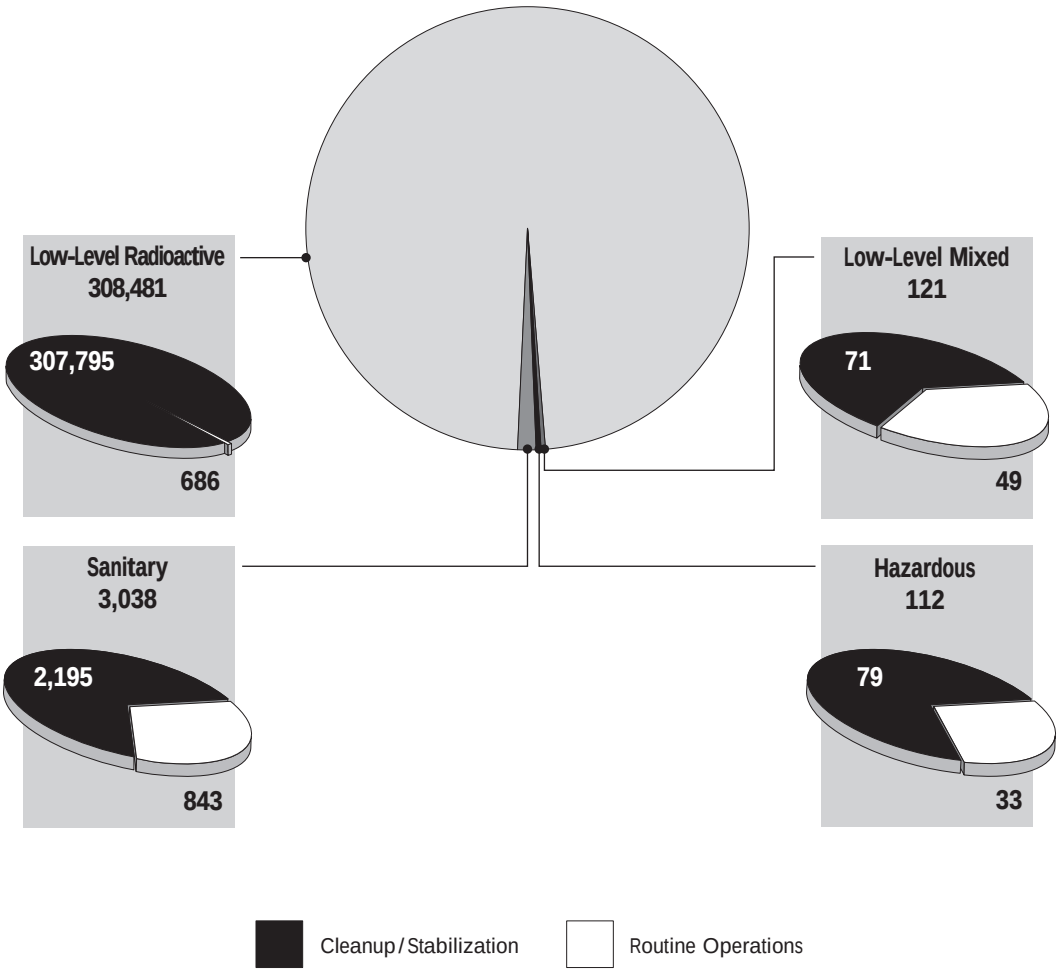


Figure 4.37
1998 Ohio Field Office Waste Generation by Waste Type (in Cubic Meters)

Richland Operations Office
Calendar Year 1998 Achievements

Number of Pollution Prevention Projects:	**137**
Total Waste Reduced:	**17,500 cubic meters**
Reported Cost Savings / Avoidance:	**$16.3 million**

Category	Performance Measure*	CY 99 Goal
Radioactive Waste	84% reduction	50%
Mixed Waste	68% reduction	50%
Hazardous Waste	77% reduction	50%
Sanitary Waste	88% reduction	33%
Recycling	84% recycled	33%
Affirmative Procurement	96% purchased	100%

* Performance measure comparison is from 1993 to 1998, except for recycling and affirmative procurement, for which performance is assessed annually.

Figure 4.38
1998 Richland Operations Office Pollution Prevention Waste Reduction by Waste Category (in Cubic Meters)

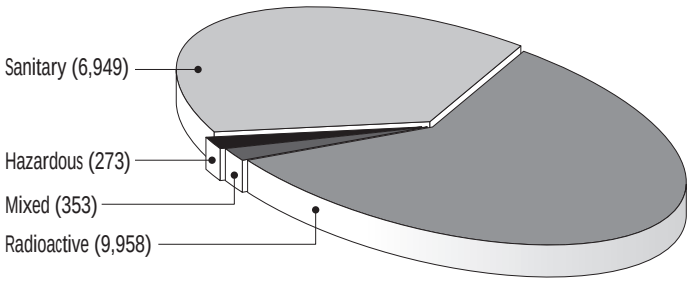


Table 4.12
1998 Richland Operations Office Pollution Prevention Accomplishments by Site

Site Name; Location	Number of Pollution Prevention Projects	Waste Reduction (Cubic Meters)	Reported Cost Savings / Avoidance (Thousands)
Hanford Site; Richland, WA	95	17,285	$15,507
Pacific Northwest National Laboratory; Richland, WA	42	248	$763

4.10 Richland Operations Office

The Richland Operations Office manages the cleanup of the Hanford Site through environmental remediation, deactivation, and decommissioning. The office also manages the development and deployment of science and technology onsite and offsite.

4.10.1 Pollution Prevention Performance

In 1998, approximately 17,500 cubic meters of waste were reduced at the Richland Operations Office's two reporting sites through implementation of pollution prevention projects (Figure 4.38). As a result, the Richland Operations Office reduced the cost of operations by approximately $16.3 million.

4.10.2 Pollution Prevention Accomplishments

The Richland Operations Office reported 137 pollution prevention projects in 1998, accounting for approximately 12 percent of the waste reduction within the DOE Complex (Table 4.12). Figure 4.39 compares waste reduction by pollution prevention activity category, and Figure 4.40 compares reported cost savings/avoidance by pollution prevention activity category, for 1997 and 1998. Examples of pollution prevention projects completed in 1998 include:

- The 313 Area Facility at the Hanford Site decontaminated numerous items (including process tanks, machinery, floors, and associated equipment and piping) to low-level radioactive waste status, avoiding a low-level mixed wastestream and associated disposal costs. This segregation activity reduced cleanup/stabilization low-level mixed waste by approximately 170 cubic meters, for a reported cost savings/avoidance of $2,242,000.

- CFC-12 refrigerant was removed from four of eight chillers at the Hanford Site, and was sold to a vendor for reuse. The CFC-12 was replaced with a CFC-free

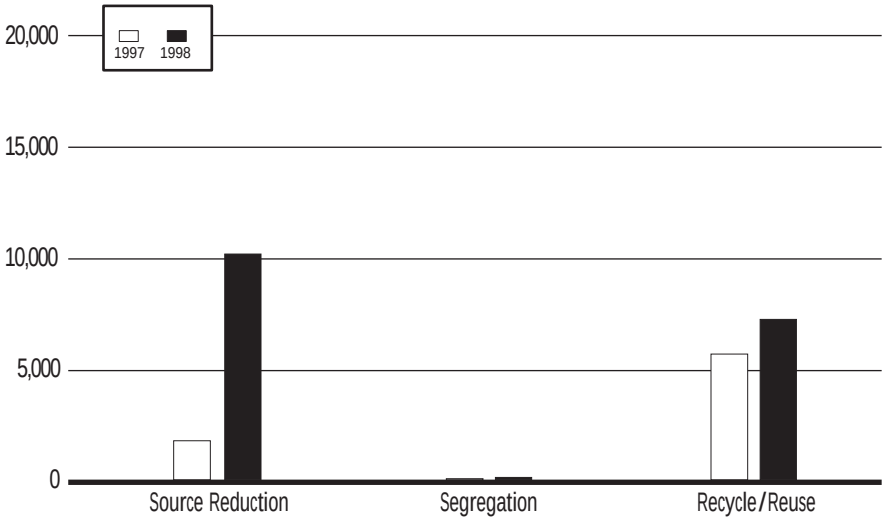


Figure 4.39 1997-1998 Richland Operations Office Waste Reduction by Pollution Prevention Activity Category (in Cubic Meters)

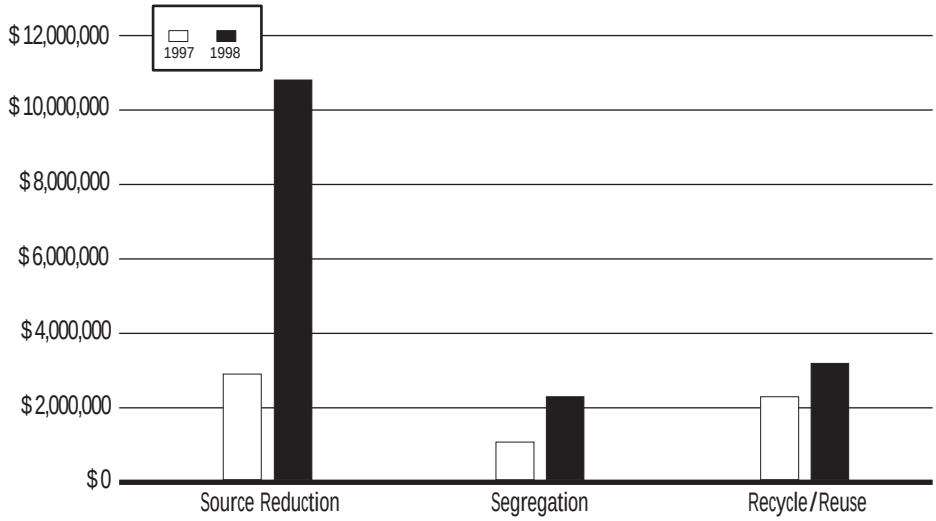


Figure 4.40 1997-1998 Richland Operations Office Reported Cost Savings/Avoidance by Pollution Prevention Activity Category (in Dollars)

refrigerant, HFC-134a. This source reduction project reduced hazardous waste by 22 metric tons, for a reported cost savings/avoidance of $144,000.

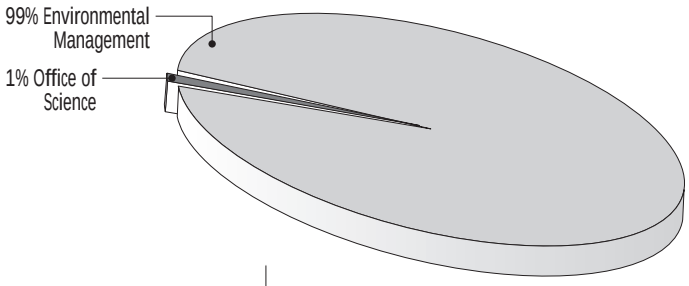
- The Pacific Northwest National Laboratory inherited an underground tank system from a previous owner of one of its buildings. The tanks were contaminated with minute amounts of radioactive material and metals identified on the toxicity characteristic list. Rather than disposing of the tanks as waste, they were recycled as radioactive scrap metal by a vendor who made them into radiation shielding blocks for use at the Los Alamos National Laboratory. In addition, the concrete vaults surrounding the tanks were left in place instead of disposing of them (accounting for approximately 18 metric tons of sanitary material). This recycle/reuse activity reduced cleanup/stabilization low-level mixed waste by approximately 11 cubic meters, for a reported cost savings/avoidance of $141,300.

- At the Pacific Northwest National Laboratory, a microplate reader was purchased that reduced the volume of waste generated by microorganism studies (e.g., during environmental remediation of groundwater). This source reduction activity reduced routine operations hazardous waste by less than one metric ton, for a reported cost savings/avoidance of $78,500.

4.10.3 Waste Generation

The total waste generated by Richland Operations Office reporting sites was approximately 20,400 cubic meters in 1998, accounting for approximately four percent of DOE's overall waste generation. Waste generated by the Richland Operations Office in 1998 is primarily attributed to Environmental Management (Figure 4.41).

Figure 4.41 1998 Richland Operations Office Waste Generation by Program Secretarial Office



In 1998, low-level radioactive waste generation of 18,100 cubic meters accounted for 89 percent of all waste generated by Richland Operations Office sites, and was the largest waste type generated (Figure 4.42). Most of this waste was generated at the Hanford Site due to cleanup/stabilization activities.

Routine operations transuranic and hazardous waste generation by Richland Operations Office sites increased 77 percent (from three to five cubic meters) and 19 percent (from 43 to 51 metric tons), respectively, from 1997 to 1998. These increases are due to the Pacific Northwest National Laboratory's increased research work.

Cleanup/stabilization low-level mixed waste generation by Richland Operations Office sites increased 80 percent (from 280 to 505 cubic meters) from 1997 to 1998. This increase is primarily solid low-level mixed waste, and is due to the increased presence of solids in the effluent processed by the Hanford Site 200 Area Liquid Effluent Facility.

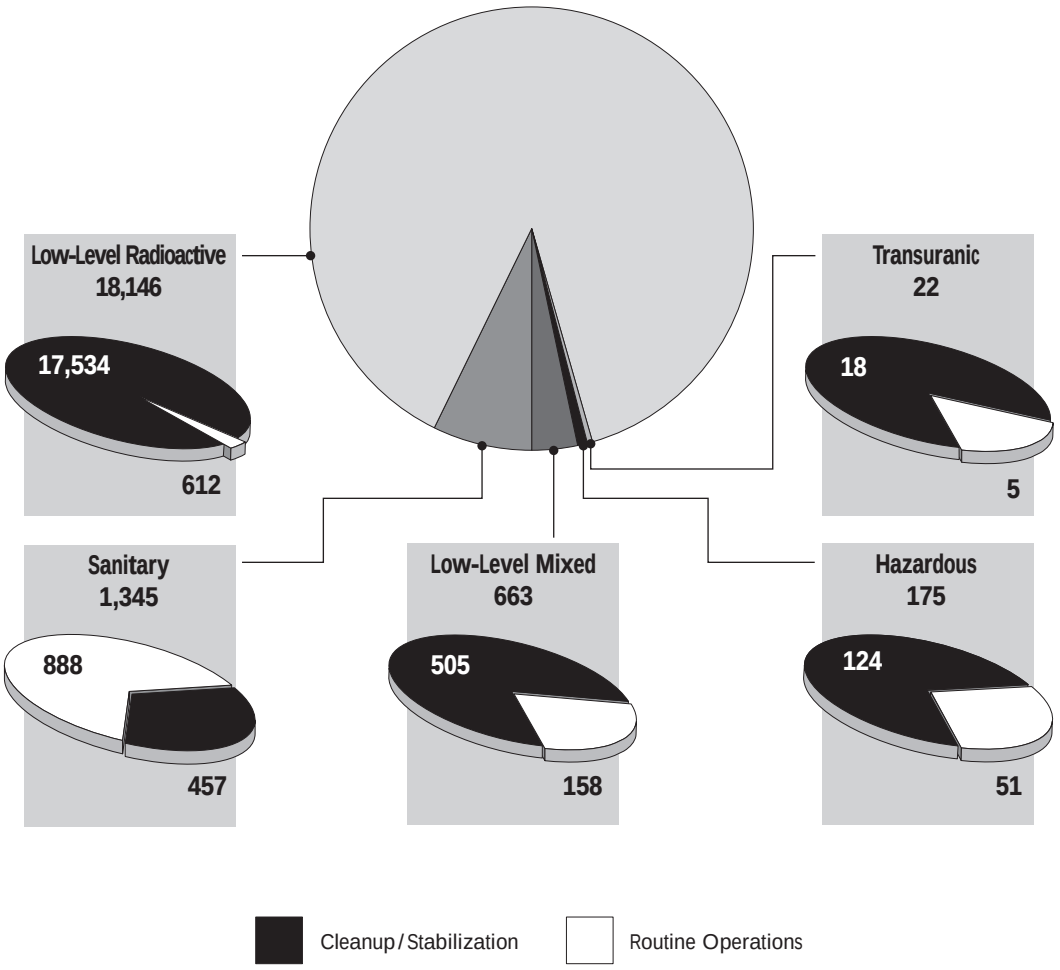


Figure 4.42
1998 Richland Operations Office Waste Generation by Waste Type (in Cubic Meters)

Rocky Flats Field Office
Calendar Year 1998 Achievements

Number of Pollution Prevention Projects:	**33**
Total Waste Reduced:	**1,600 cubic meters**
Reported Cost Savings / Avoidance:	**$420,000**

Category	Performance Measure*	CY 99 Goal
Radioactive Waste	100% reduction**	50%
Mixed Waste	100% reduction**	50%
Hazardous Waste	100% reduction**	50%
Sanitary Waste	83% reduction	33%
Recycling	30% recycled	33%
Affirmative Procurement	98% purchased	100%

* Performance measure comparison is from 1993 to 1998, except for recycling and affirmative procurement, for which performance is assessed annually.

** All waste generated in 1998 is primary waste from closure activities or secondary waste generated in support of closure as the total focus of the site has shifted to cleanup/stabilization activities.

Figure 4.43
1998 Rocky Flats Field Office Pollution Prevention Waste Reduction by Waste Category (in Cubic Meters)

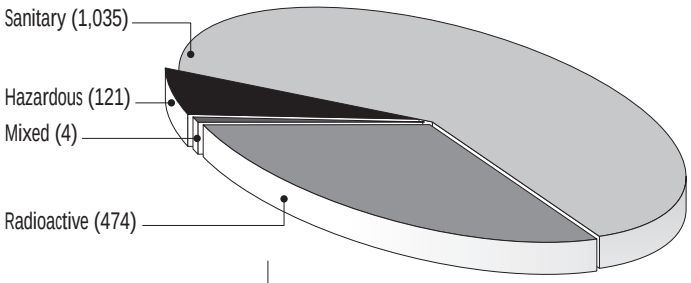


Table 4.13
1998 Rocky Flats Field Office Pollution Prevention Accomplishments by Site

Site Name; Location	Number of Pollution Prevention Projects	Waste Reduction (Cubic Meters)	Reported Cost Savings / Avoidance (Thousands)
Rocky Flats Environmental Technology Site; Golden, CO	33	1,634	$420

4.11 Rocky Flats Field Office

The Rocky Flats Field Office manages wastes and materials, environmental cleanup operations, and conversion of the Rocky Flats Environmental Technology Site to beneficial reuse.

4.11.1 Pollution Prevention Performance

In 1998, approximately 1,600 cubic meters of waste were reduced at the Rocky Flats Field Office's one reporting site through implementation of pollution prevention projects (Figure 4.43). As a result, the Rocky Flats Field Office reduced the cost of operations by approximately $420,000.

4.11.2 Pollution Prevention Accomplishments

The Rocky Flats Field Office reported 33 pollution prevention projects in 1998, accounting for approximately one percent of the waste reduction within the DOE Complex (Table 4.13). Figure 4.44 compares waste reduction by pollution prevention activity category, and Figure 4.45 compares reported cost savings/avoidance by pollution prevention activity category, for 1997 and 1998. Examples of pollution prevention projects completed in 1998 include:

- At the Rocky Flats Environmental Technology Site, approximately 219,963 pounds of radioactively contaminated scrap metal generated during decommissioning and cleanup of the 980/968/964 areas were shipped to a vendor for processing and reuse as shield blocks. This recycle/reuse activity reduced cleanup/stabilization low-level radioactive waste by approximately 453 cubic meters, for a reported cost savings/avoidance of $120,000.

- At the Rocky Flats Environmental Technology Site, approximately 6,700 gallons of nitric acid purchased for, but not used in, a plutonium recovery process were transferred from Building 371 to a private industry for use. This recycle/reuse activity reduced cleanup/stabilization hazardous

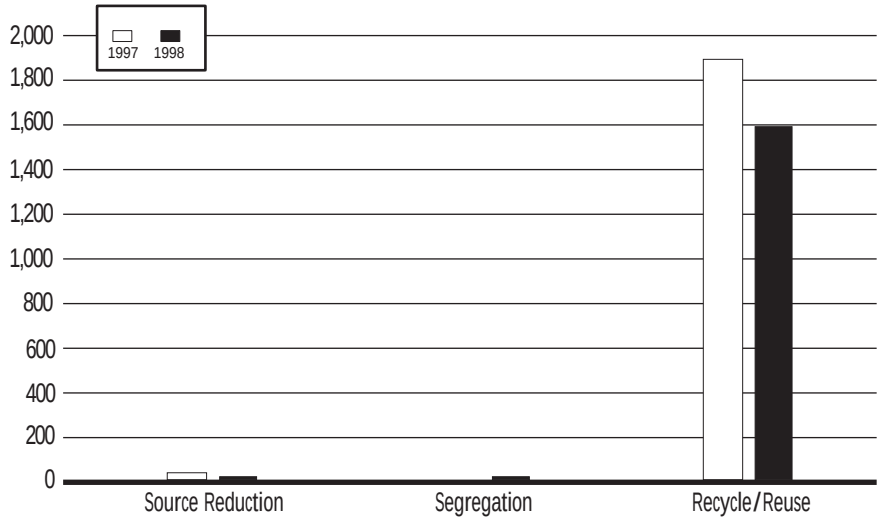


Figure 4.44 1997-1998 Rocky Flats Field Office Waste Reduction by Pollution Prevention Activity Category (in Cubic Meters)

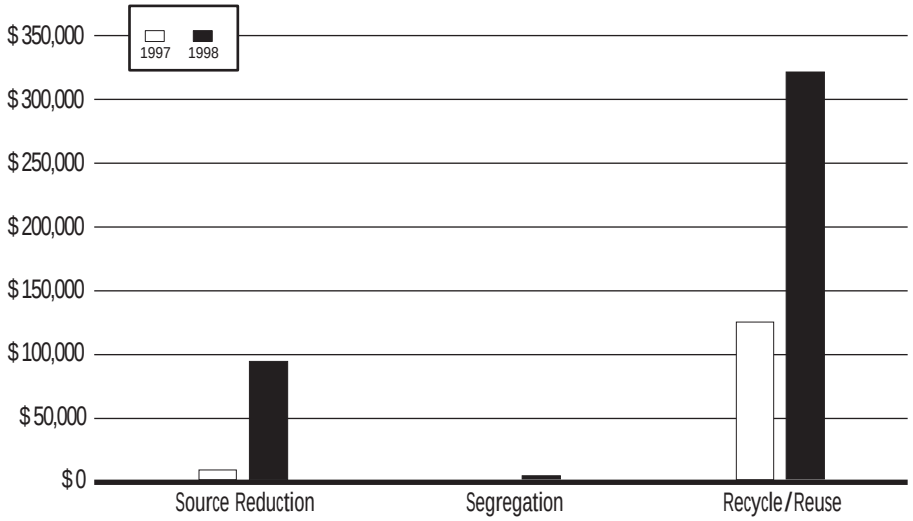


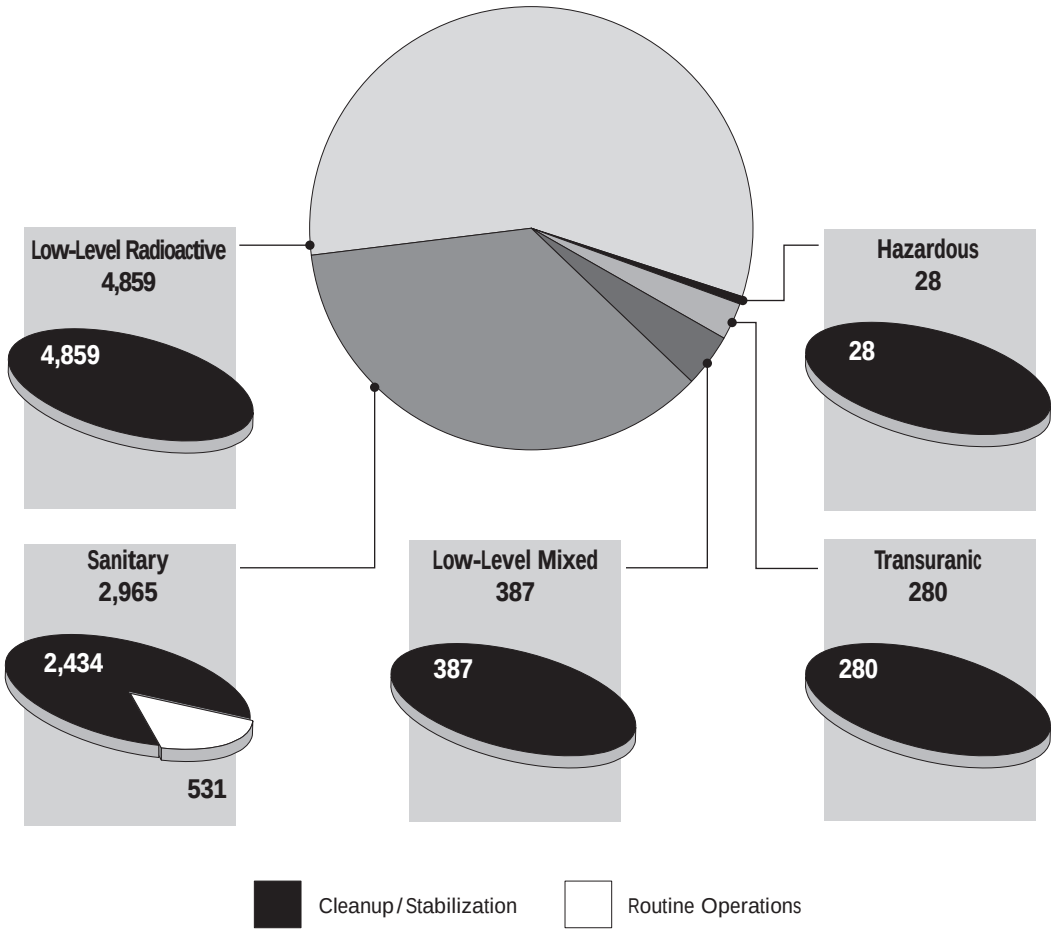
Figure 4.45 1997-1998 Rocky Flats Field Office Reported Cost Savings/Avoidance by Pollution Prevention Activity Category (in Dollars)

waste by approximately 36 metric tons, for a reported cost savings/avoidance of $16,000.

4.11.3 Waste Generation

The total waste generated by the Rocky Flats Field Office's one reporting site was approximately 8,500 cubic meters in 1998, accounting for approximately two percent of DOE's overall waste generation. Waste generated by the Rocky Flats Field Office in 1998 is attributed to Environmental Management.

Figure 4.46
1998 Rocky Flats Field Office Waste Generation by Waste Type (in Cubic Meters)



In 1998, the Rocky Flats Environmental Technology Site generated the most transuranic waste within the DOE Complex (280 cubic meters, 54 percent; Figure 4.46). All of this waste was generated due to cleanup/stabilization activities.

Routine operations waste generation of all waste types by the Rocky Flats Environmental Technology Site decreased from 1997 to 1998. In 1998, the Rocky Flats Environmental Technology Site defined all transuranic, low-level radioactive, low-level mixed, and hazardous wastes generated onsite as cleanup/stabilization waste, as the total focus of the site has shifted to cleanup/stabilization activities, namely deactivation and decommissioning, and environmental restoration of contaminated soils and water.

Cleanup/stabilization transuranic, low-level radioactive, low-level mixed, and sanitary waste generation by the Rocky Flats Environmental Technology Site increased 206 percent (from 91 to 280 cubic meters), 173 percent (from 1,780 to 4,859 cubic meters), 299 percent (from 97 to 387 cubic meters), and 725 percent (from 295 to 2,434 metric tons), respectively, from 1997 to 1998. The increase in transuranic waste generation is due to increased deactivation and decommissioning efforts in the plutonium processing buildings. The increases in low-level radioactive and low-level mixed waste generation are due to deactivation and decommissioning efforts in the plutonium processing building, and the demolition of the former health physics building. The increase in sanitary waste generation is due to industrial waste from increased cleanup activities.

4.12 Savannah River Operations Office

The Savannah River Operations Office serves the national interest by providing leadership, direction, and oversight to ensure that Savannah River Site programs, operations, and resources are managed in an open, safe, environmentally sound, and cost-effective manner. The Office's previous mission was to produce nuclear materials for national defense.

4.12.1 Pollution Prevention Performance

In 1998, approximately 1,600 cubic meters of waste were reduced at the Savannah River Operations Office's one reporting site through implementation of pollution prevention projects (Figure 4.47). As a result, the Savannah River Operations Office reduced the cost of operations by $10.6 million.

4.12.2 Pollution Prevention Accomplishments

The Savannah River Operations Office reported 39 pollution prevention projects in 1998, accounting for one percent of the waste reduction within the DOE Complex (Table 4.14). Figure 4.48 compares waste reduction by pollution prevention activity category, and Figure 4.49 compares reported cost savings/avoidance by pollution prevention activity category, for 1997 and 1998. Examples of pollution prevention projects completed in 1998 include:

- At the Savannah River Site, over 100 Radiological Control Area rollbacks were completed, which reclaimed Radiological Control Areas, thus eliminating operator exposure, as well as the generation of low-level radioactive waste and laundry. These routine operations source reduction projects reduced low-level radioactive waste by 509 cubic meters, for a reported cost savings/avoidance of approximately $5 million.

Savannah River Operations Office Calendar Year 1998 Achievements

Number of Pollution Prevention Projects: **39**

Total Waste Reduced: **1,600 cubic meters**

Reported Cost Savings / Avoidance: **$10.6 million**

Category	Performance Measure*	CY 99 Goal
Radioactive Waste	58% reduction	50%
Mixed Waste	248% increase	50%
Hazardous Waste	173% increase	50%
Sanitary Waste	60% reduction	33%
Recycling	49% recycled	33%
Affirmative Procurement	100% purchased	100%

* Performance measure comparison is from 1993 to 1998, except for recycling and affirmative procurement, for which performance is assessed annually.

Figure 4.47
1998 Savannah River Operations Office Pollution Prevention Waste Reduction by Waste Category (in Cubic Meters)

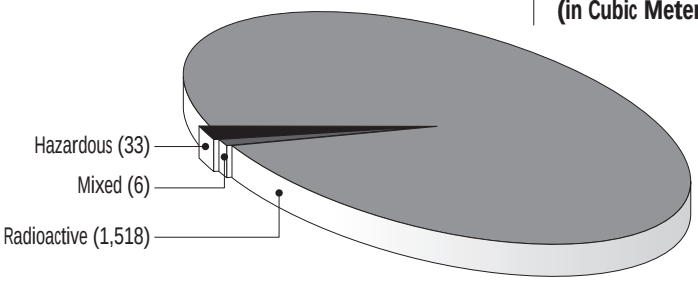


Table 4.14
1998 Savannah River Operations Office Pollution Prevention Accomplishments by Site

Site Name; Location	Number of Pollution Prevention Projects	Waste Reduction (Cubic Meters)	Reported Cost Savings / Avoidance (Thousands)
Savannah River Site; Aiken, SC	39	1,557	$10,588

Figure 4.48
1997-1998
Savannah River Operations Office
Waste Reduction by Pollution Prevention Activity Category (in Cubic Meters)

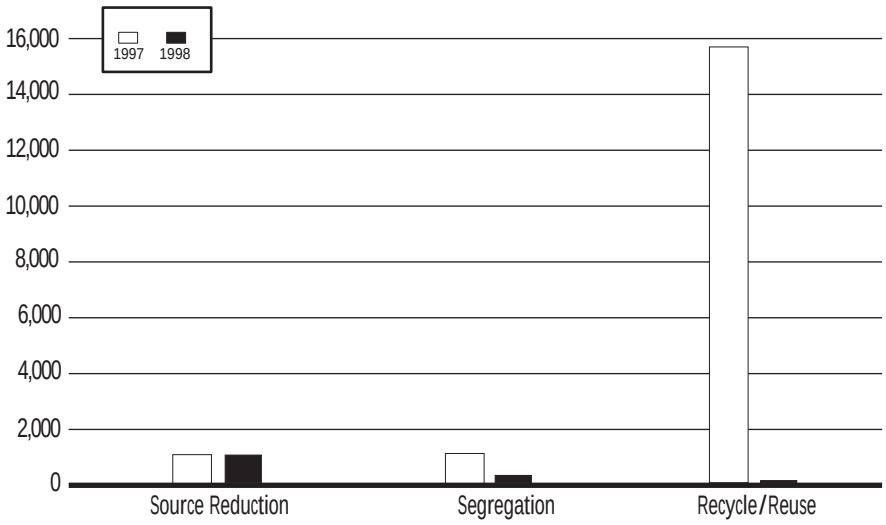
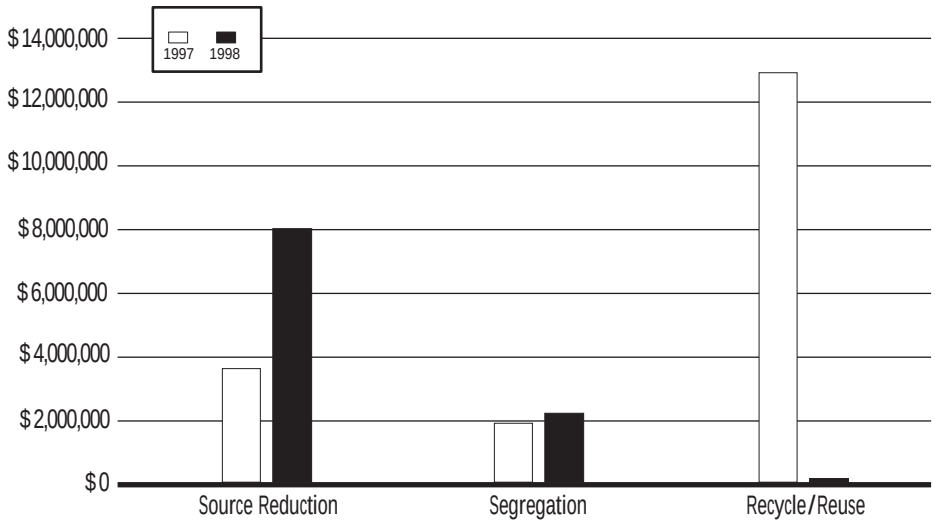


Figure 4.49
1997-1998
Savannah River Operations Office
Reported Cost Savings/Avoidance by Pollution Prevention Activity Category (in Dollars)



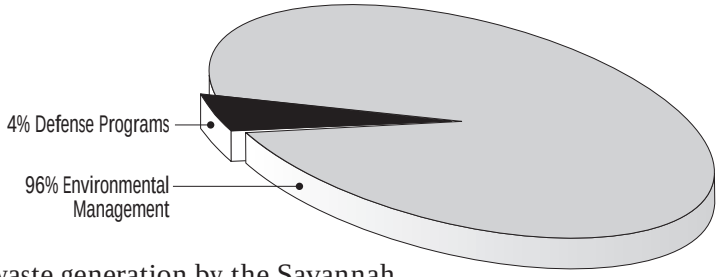
- At the Savannah River Site, two beneficial projects were completed which fabricated radioactive scrap metal into shielding bricks for use at the Site, avoiding the generation of low-level radioactive waste, and extending disposal facility life. These recycle/reuse projects reduced low-level radioactive waste by over 97 cubic meters, for a reported cost savings/avoidance of $147,378.

- At the Savannah River Site, the Defense Waste Processing Facility (DWPF) 221-S Laboratory implemented a process change in routine laboratory operations to reduce low-level radioactive waste generation. The new method uses disposable transfer drawer liners to reduce the frequency/need for decontaminating transfer drawers, and to eliminate the reprocessing of "clean waste" that may become contaminated from the use of the transfer drawers. This source reduction project reduced low-level radioactive waste by over 39 cubic meters, for a reported cost savings/avoidance of $17,962.

4.12.3 Waste Generation

The total waste generated by the Savannah River Operations Office's one reporting site was approximately 16,500 cubic meters in 1998, accounting for approximately four percent of DOE's overall waste generation. Waste generated by the Savannah River Operations Office in 1998 is primarily attributed to Environmental Management (Figure 4.50).

Figure 4.50
1998 Savannah River Operations Office Waste Generation by Program Secretarial Office

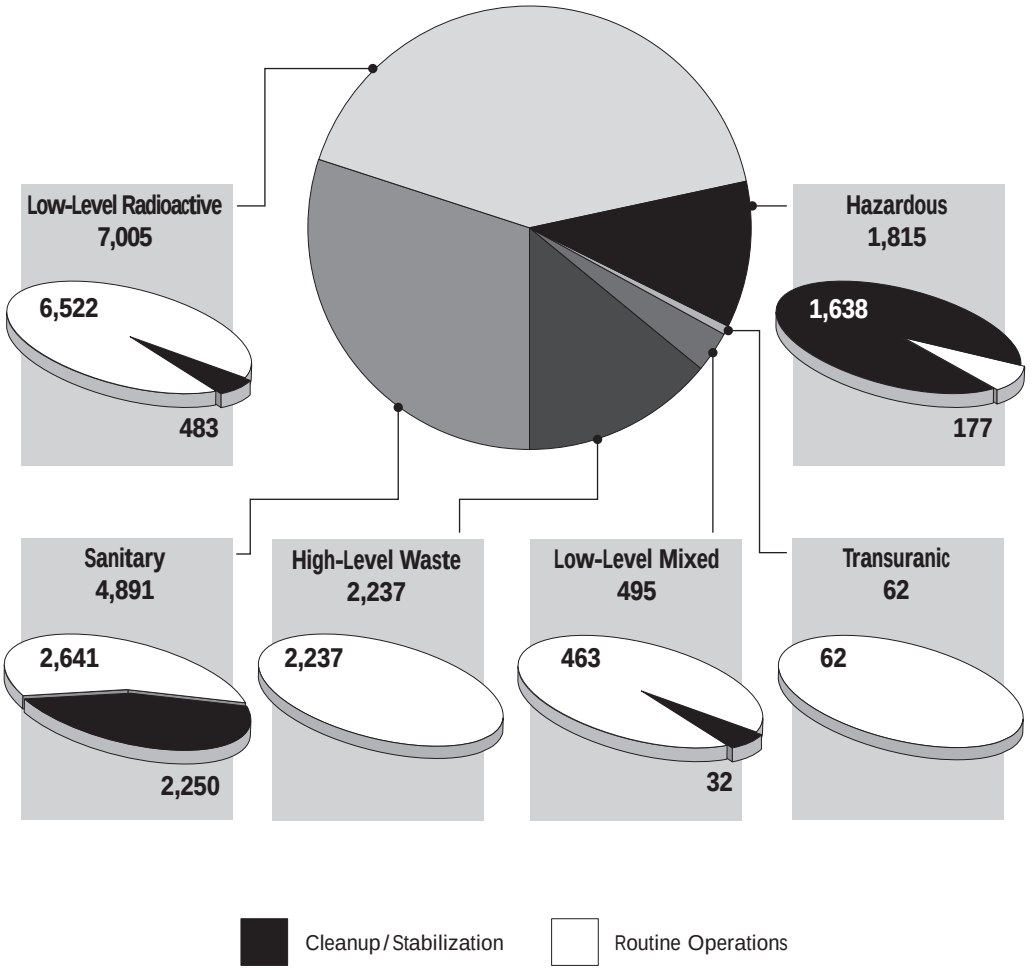


In 1998, the Savannah River Site generated all of the high-level waste within the DOE Complex (2,200 cubic meters; Figure 4.51). This waste was generated due to routine operations activities.

Routine operations low-level mixed and hazardous waste generation by the Savannah River Site increased 62 percent (from 286 to 463 cubic meters) and 222 percent (from 55 to 177 metric tons), respectively, from 1997 to 1998. The increase in low-level mixed waste generation is primarily due to increased work load and associated laboratory discharges at the Savannah River Technology Center. The increase in hazardous waste generation is primarily due to Defense Waste Processing Facility Operations.

Cleanup/stabilization low-level mixed, hazardous, and sanitary waste generation by the Savannah River Site increased 440 percent (from six to 32 cubic meters), 81,800 percent (from two to 1,638 metric tons), and 43 percent (from 1,577 to 2,250 metric tons), respectively, from 1997 to 1998. The increase in low-level mixed waste generation is primarily due to two major remediation and deactivation and decommissioning projects, Building 690-N and the 105-K Process Run D/R K-Area Maintenance Storage. The increase in hazardous waste generation is primarily due to deactivation and decommissioning projects such as L-Area Rubble, Basin Cleanup, TNX-Area, and Building 690-N. The increase in sanitary waste generation is due to increased construction activities associated with project startups.

Figure 4.51
1998 Savannah River Operations Office Waste Generation by Waste Type (in Cubic Meters)



4.13 Headquarters

The DOE sites reporting to Headquarters include the Federal Energy Technology Center, Southeastern Power Administration, Southwestern Power Administration, Strategic Petroleum Reserve Project Management Office, Western Area Power Administration, and the Yucca Mountain Site Characterization Office. The primary missions of these sites are research and development, fossil energy, and power marketing.

4.13.1 Pollution Prevention Performance

In 1998, approximately 13,500 cubic meters of waste were reduced at two of the Headquarters' reporting sites through implementation of pollution prevention projects (Figure 4.52). As a result, Headquarters reduced the cost of operations by approximately $77,700.

4.13.2 Pollution Prevention Accomplishments

Headquarters sites reported 24 pollution prevention projects in 1998, accounting for nine percent of the waste reduction within the DOE Complex (Table 4.15). Figure 4.53 compares waste reduction by pollution prevention activity category, and Figure 4.54 compares reported cost savings/ avoidance by pollution prevention activity category, for 1997 and 1998. Examples of pollution prevention projects completed in 1998 include:

- The Western Area Power Administration salvaged copper, steel, and aluminum during transmission line and substation renovations. Some of the steel was sold for recycling. Transformers and circuit breakers were salvaged for the metal. This recycle/reuse activity reduced cleanup/stabilization sanitary waste by 924 metric tons, for a reported cost savings/avoidance of $30,400.

Headquarters
Calendar Year 1998 Achievements

Number of Pollution Prevention Projects: **24**

Total Waste Reduced: **13,500 cubic meters**

Reported Cost Savings / Avoidance: **$77,700**

Category	Performance Measure*	CY 99 Goal
Hazardous Waste	63% reduction	50%
Sanitary Waste	84% reduction	33%
Recycling	66% recycled	33%
Affirmative Procurement	81% purchased	100%

* Performance measure comparison is from 1993 to 1998, except for recycling and affirmative procurement, for which performance is assessed annually.

Figure 4.52
1998 Headquarters Pollution Prevention Waste Reduction by Waste Category (in Cubic Meters)

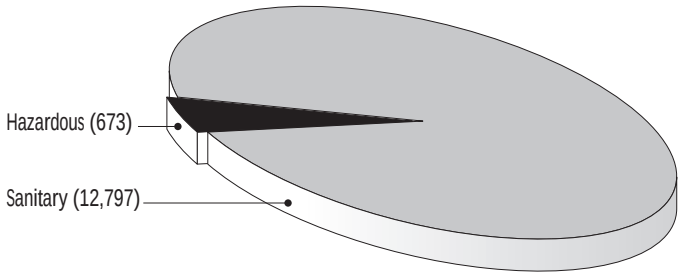


Table 4.15
1998 Headquarters Pollution Prevention Accomplishments by Site*

Site Name; Location	Number of Pollution Prevention Projects	Waste Reduction (Cubic Meters)	Reported Cost Savings / Avoidance (Thousands)
Strategic Petroleum Reserve Project Management Office; New Orleans, LA	5	10,965	$9.6
Western Area Power Administration; Golden, CO	19	2,505	$68

* Sites that did not report pollution prevention projects in 1998 are not included in this table.

Figure 4.53
1997-1998 Headquarters Waste Reduction by Pollution Prevention Activity Category (in Cubic Meters)

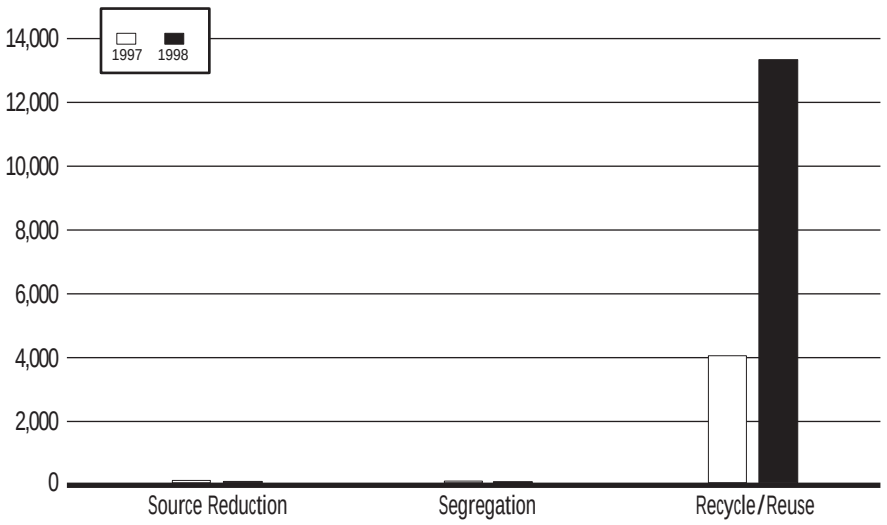
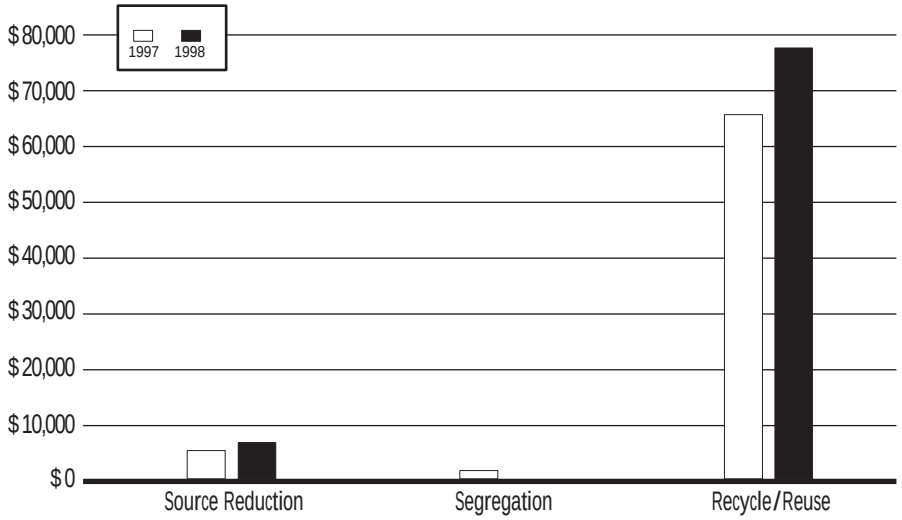


Figure 4.54
1997-1998 Headquarters Reported Cost Savings / Avoidance by Pollution Prevention Activity Category (in Dollars)



- The Strategic Petroleum Reserve Project Management Office mixed calcium sulfate, a by-product of mining salt, with clay, for use as a road bed sub-base. This recycle/reuse activity reduced routine operations sanitary waste by 5,350 metric tons. Cost savings were not determined for this project.

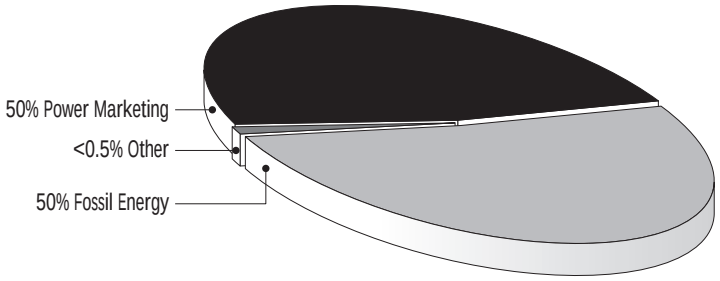
- The Strategic Petroleum Reserve Project Management Office recycled fluorescent lamps, metallic mercury, antifreeze, and ethylene glycol (classified as a universal waste) for a routine operations sanitary waste reduction of one metric ton. Cost savings were not determined for this project.

4.13.3 Waste Generation

The total waste generated by Headquarters' six reporting sites was approximately 2,200 metric tons in 1998, accounting for less than one percent of DOE's overall waste generation. Waste generated by Headquarters in 1998 is primarily attributed to the Office of Fossil Energy and the Power Marketing Administration (Figure 4.55).

In 1998, sanitary waste generation of 1,900 metric tons accounted for 88 percent of all waste generated by Headquarters sites, and was the largest waste type generated (Figure 4.56). Most of this waste was generated at the Western Area Power Administration due to routine operations activities.

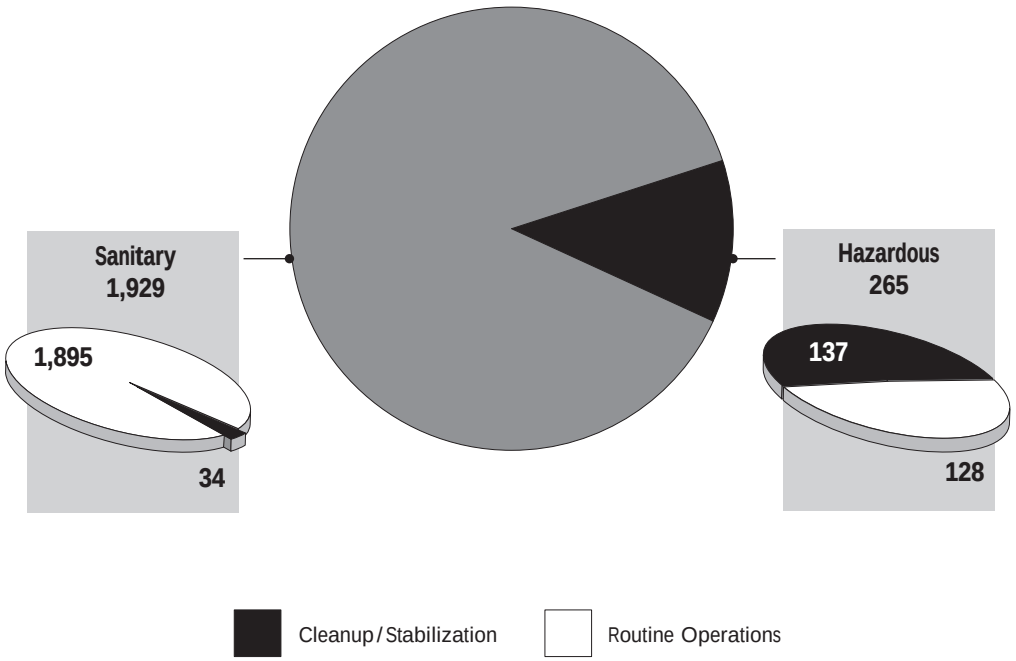
Figure 4.55
1998 Headquarters Waste Generation by Program Secretarial Office



Routine operations hazardous and sanitary waste generation by Headquarters sites increased 44 percent (from 89 to 128 metric tons) and 17 percent (from 1,617 to 1,895 metric tons), respectively, from 1997 to 1998. The increase in hazardous waste generation is primarily due to polychlorinated biphenyl-contaminated electrical equipment and debris at the Western Area Power Administration. The increase in sanitary waste generation is primarily due to the reporting of waste generation at the Strategic Petroleum Reserve Project Management Office, which did not report in 1997, and an increase in the research and development workload at the Federal Energy Technology Center – Pittsburgh.

Cleanup/stabilization sanitary waste generation by Headquarters sites increased 74 percent (from 19 to 34 metric tons) from 1997 to 1998. The increase in sanitary waste generation is due to the reporting of waste generation at the Southwestern Power Administration, which did not report in 1997.

Figure 4.56
1998 Headquarters Waste Generation by Waste Type (in Cubic Meters)



Appendix A

Data Tables

This Appendix presents Calendar Year 1998 pollution prevention accomplishment and waste generation data for the DOE Complex.

Table A-1
Waste Reduction from Pollution Prevention Projects in 1998, for All Waste Types, by Operations/Field Office* (in Cubic Meters)

Operations/ Field Office	High-Level	Transuranic	Low-Level Radioactive	Low-Level Mixed	Hazardous	Sanitary	TOTAL REPORTED WASTE REDUCTION
Albuquerque		30	2,928	971	747	14,527	**19,204**
Chicago			70	8	16,161	6,490	**22,729**
Idaho			24	1	298	823	**1,145**
Nevada					158	1,822	**1,979**
Oakland			534	<0.5	57	1,501	**2,093**
Oak Ridge		<0.5	11,257	37,379	195	16,057	**64,887**
Ohio			1,041	35	54	751	**1,882**
Richland		1	9,957	353	273	6,949	**17,533**
Rocky Flats			474	4	121	1,035	**1,634**
Savannah River		197	1,321	6	33		**1,557**
Headquarters					673	12,797	**13,470**
TOTAL	**0**	**228**	**27,607**	**38,757**	**18,768**	**62,753**	**148,113**

* Numbers have been rounded to the nearest cubic meter.

Table A-2
Reported Cost Savings / Avoidance from Pollution Prevention Projects in 1998, for All Waste Types, by Operations / Field Office*

Operations / Field Office	High-Level	Transuranic	Low-Level Radioactive	Low-Level Mixed	Hazardous	Sanitary	TOTAL REPORTED COST SAVINGS
Albuquerque		$4,500,000	$2,857,721	$72,837,266	$3,125,319	$2,696,899	**$86,017,205**
Chicago			$102,100	$273,292	$6,129,995	$544,879	**$7,050,266**
Idaho			$85,142	$8,080	$5,523,301	$3,793,850	**$9,410,373**
Nevada					$698,621	$193,111	**$891,732**
Oakland			$1,498,200	$777,600	$674,639	$430,761	**$3,381,200**
Oak Ridge		$30,483	$6,743,704	$1,406,494	$10,118,346	$4,375,473	**$22,674,500**
Ohio			$1,017,712	$932,625	$59,024	$573,103	**$2,582,464**
Richland		$16,000	$9,861,576	$3,102,763	$1,413,113	$1,875,707	**$16,269,159**
Rocky Flats			$124,328	$22,686	$162,257	$110,777	**$420,048**
Savannah River		$1,855,503	$8,557,676	$84,534	$90,152		**$10,587,865**
Headquarters					$1,900	$75,811	**$77,711**
TOTAL	**$0**	**$6,401,986**	**$30,848,159**	**$79,445,340**	**$27,996,668**	**$14,670,372**	**$159,362,525**

* Numbers have been rounded to the nearest dollar.

Table A-3
High-Level Waste Generation in 1998 by Site (in Cubic Meters)

Site	Routine Operations	Cleanup/Stabilization	TOTAL
Savannah River Site	2,237	0	2,237
TOTAL	**2,237**	**0**	**2,237**

Table A-4
Transuranic Waste* Generation in 1998 by Site (in Cubic Meters)

Site	Routine Operations	Cleanup/Stabilization	TOTAL
Rocky Flats Environmental Technology Site	0	280	280
Los Alamos National Laboratory	99	42	141
Savannah River Site	62	0	62
Hanford Site	0	16	16
Oak Ridge National Laboratory	3	3	6
Pacific Northwest National Laboratory	5	1	6
Idaho National Engineering and Environmental Laboratory	0	4	4
Lawrence Livermore National Laboratory	2	0	2
Argonne National Laboratory - East	<0.5	0	<0.5
Argonne National Laboratory - West	<0.5	0	<0.5
TOTAL	**172**	**346**	**518**

* Includes mixed transuranic waste.

Table A-5
Low-Level Radioactive Waste Generation in 1998 by Site (in Cubic Meters)

Site	Routine Operations	Cleanup/Stabilization	TOTAL
Fernald Environmental Management Project	480	293,410	293,890
Hanford Site	561	17,460	18,020
Mound Plant	0	12,822	12,822
Savannah River Site	6,522	483	7,005
Rocky Flats Environmental Technology Site	0	4,859	4,859
Idaho National Engineering and Environmental Laboratory	1,243	1,648	2,891
Oak Ridge Y-12 Plant	2,224	<0.5	2,224
Energy Technology Engineering Center	0	2,039	2,039
Paducah Gaseous Diffusion Plant	0	1,721	1,721
Los Alamos National Laboratory	566	841	1,407
Pantex Plant	55	1,265	1,320
RMI Environmental Services	0	975	975
Sandia National Laboratories/New Mexico	11	732	743
Oak Ridge National Laboratory	291	273	564
Nevada Test Site	0	548	548
Argonne National Laboratory - East	244	285	529
Battelle Columbus Laboratories	0	486	486
Lawrence Livermore National Laboratory	203	185	388
East Tennessee Technology Park	123	237	360
Argonne National Laboratory - West	274	84	358
Brookhaven National Laboratory	256	92	348
West Valley Demonstration Project	206	101	306
Portsmouth Gaseous Diffusion Plant	0	244	244
Fermi National Accelerator Laboratory	226	0	226
Pacific Northwest National Laboratory	52	75	126
Grand Junction Projects Office	40	40	80
Lawrence Berkeley National Laboratory	19	9	28
Inhalation Toxicology Laboratory	26	0	26
Princeton Plasma Physics Laboratory	15	0	15
Thomas Jefferson National Accelerator Facility	14	0	14
Stanford Linear Accelerator Center	0	10	10
Environmental Measurements Laboratory	3	<0.5	3
Oak Ridge Institute for Science and Education	<0.5	2	2
Sandia National Laboratories/California	2	0	2
TOTAL	**13,653**	**340,927**	**354,581**

Table A-6
Low-Level Mixed* Waste Generation in 1998 by Site (in Cubic Meters)

Site	Routine Operations	Cleanup/Stabilization	TOTAL
Oak Ridge Y-12 Plant	204	990	1,193
Idaho National Engineering and Environmental Laboratory	60	741	801
East Tennessee Technology Park	151	646	797
Hanford Site	138	497	635
Los Alamos National Laboratory	5	514	518
Savannah River Site	463	32	495
Portsmouth Gaseous Diffusion Plant	0	449	449
Rocky Flats Environmental Technology Site	0	387	387
Nevada Test Site	0	263	263
Paducah Gaseous Diffusion Plant	0	253	253
Fernald Environmental Management Project	48	62	110
Lawrence Livermore National Laboratory	92	10	102
Grand Junction Projects Office	<0.5	65	65
Oak Ridge National Laboratory	4	29	33
Pacific Northwest National Laboratory	20	8	28
Sandia National Laboratories/New Mexico	1	9	10
RMI Environmental Services	0	7	7
Argonne National Laboratory - West	1	5	6
Brookhaven National Laboratory	6	0	6
Lawrence Berkeley National Laboratory	2	2	4
Pantex Plant	2	0	2
West Valley Demonstration Project	2	0	2
Battelle Columbus Laboratories	0	1	1
Energy Technology Engineering Center	0	1	1
Mound Plant	0	1	1
Fermi National Accelerator Laboratory	<0.5	0	<0.5
Oak Ridge Institute for Science and Education	<0.5	0	<0.5
Sandia National Laboratories/California	0	<0.5	<0.5
TOTAL	**1,198**	**4,970**	**6,169**

* Includes low-level mixed and Toxic Substances Control Act mixed waste.

Table A-7
Hazardous* Waste Generation in 1998 by Site (in Metric Tons)

Site	Routine Operations	Cleanup/Stabilization	TOTAL
Brookhaven National Laboratory	128	2,487	2,615
Kansas City Plant	100	2,030	2,130
Savannah River Site	177	1,638	1,815
Los Alamos National Laboratory	269	1,506	1,776
Oak Ridge Y-12 Plant	18	1,298	1,316
Pantex Plant	153	977	1,130
Stanford Linear Accelerator Center	61	1,063	1,124
Fermi National Accelerator Laboratory	42	908	950
Lawrence Livermore National Laboratory	253	320	573
Argonne National Laboratory - East	293	258	552
Princeton Plasma Physics Laboratory	12	148	160
Sandia National Laboratories/New Mexico	74	68	142
Federal Energy Technology Center - Pittsburgh	6	122	128
Hanford Site	11	110	121
Western Area Power Administration	104	<0.5	104
Lawrence Berkeley National Laboratory	42	61	103
Waste Isolation Pilot Plant	80	0	80
Sandia National Laboratories/California	23	52	75
Nevada Test Site	50	18	68
Mound Plant	5	57	62
Pacific Northwest National Laboratory	40	14	54
Oak Ridge National Laboratory	26	16	42
Idaho National Engineering and Environmental Laboratory	21	20	41
Southwestern Power Administration	14	15	29
Rocky Flats Environmental Technology Site	0	28	28
West Valley Demonstration Project	28	0	28
Fernald Environmental Management Project	<0.5	22	22
Portsmouth Gaseous Diffusion Plant	0	18	18
Energy Technology Engineering Center	6	8	13
Ames Laboratory	9	0	9
East Tennessee Technology Park	2	2	4
Thomas Jefferson National Accelerator Facility	4	0	4
Argonne National Laboratory - West	3	0	3
Inhalation Toxicology Laboratory	3	0	3
Strategic Petroleum Reserve Project Management Office	3	0	3
Grand Junction Projects Office	2	0	2
Office of Scientific and Technical Information	2	0	2
Environmental Measurements Laboratory	0	1	1
Oak Ridge Institute for Science and Education	1	0	1
Weldon Spring Site Remedial Action Project	0	1	1
Yucca Mountain Site Characterization Office	1	0	1
TOTAL	**2,067**	**13,264**	**15,331**

* Includes Resource Conservation and Recovery Act regulated, State regulated, and Toxic Substances Control Act regulated waste.

Table A-8
Sanitary Waste Generation in 1998 by Site (in Metric Tons)

Site	Routine Operations	Cleanup/Stabilization	TOTAL
Sandia National Laboratories/New Mexico	3,707	5,529	9,236
Nevada Test Site	6,461	1,647	8,107
Oak Ridge Y-12 Plant	6,795	453	7,248
Idaho National Engineering and Environmental Laboratory	1,957	4,271	6,228
Kansas City Plant	0	4,909	4,909
Savannah River Site	2,641	2,250	4,891
Lawrence Livermore National Laboratory	2,106	2,446	4,552
Paducah Gaseous Diffusion Plant	5	3,969	3,974
Grand Junction Projects Office	3,578	0	3,578
Rocky Flats Environmental Technology Site	531	2,434	2,965
Mound Plant	317	2,100	2,417
Los Alamos National Laboratory	2,088	0	2,088
Lawrence Berkeley National Laboratory	631	1,249	1,880
Argonne National Laboratory - East	804	1,045	1,850
Weldon Spring Site Remedial Action Project	0	1,684	1,684
Oak Ridge National Laboratory	822	770	1,592
Western Area Power Administration	1,357	18	1,375
Hanford Site	813	457	1,270
East Tennessee Technology Park	390	715	1,105
Argonne National Laboratory - West	885	0	885
Waste Isolation Pilot Plant	821	0	821
Brookhaven National Laboratory	743	0	743
Pantex Plant	657	0	657
Stanford Linear Accelerator Center	576	0	576
Strategic Petroleum Reserve Project Management Office	424	0	424
Fermi National Accelerator Laboratory	357	0	357
West Valley Demonstration Project	343	0	343
Sandia National Laboratories/California	196	144	340
Fernald Environmental Management Project	183	95	278
Thomas Jefferson National Accelerator Facility	225	0	225
Federal Energy Technology Center - Pittsburgh	114	0	114
Princeton Plasma Physics Laboratory	89	0	89
Pacific Northwest National Laboratory	75	0	75
Energy Technology Engineering Center	69	0	69
Southwestern Power Administration	1	15	16
Oak Ridge Institute for Science and Education	1	0	1
TOTAL	**40,761**	**36,200**	**76,961**

Table A-9
1998 Total Routine Operations and Cleanup / Stabilization Waste Generation by Program and Waste Type (in Cubic Meters)

Program	High-Level			Transuranic		
	Routine Operations	Cleanup / Stabilization	Total High-Level	Routine Operations	Cleanup / Stabilization	Total Transuranic
Defense Programs	0	0	**0**	99	16	**115**
Office of Science	0	0	**0**	5	2	**7**
Environmental Management	2,237	0	**2,237**	67	328	**395**
Nuclear Energy	0	0	**0**	<0.5	0	**<0.5**
Power Marketing Administration	0	0	**0**	0	0	**0**
Others*	0	0	**0**	0	0	**0**
TOTAL	**2,237**	**0**	**2,237**	**172**	**346**	**518**

Program	Low-Level Radioactive§			Low-Level Mixed§		
	Routine Operations	Cleanup / Stabilization	Total Low-Level Radioactive	Routine Operations	Cleanup / Stabilization	Total Low-Level Mixed
Defense Programs	3,322	751	**4,073**	87	711	**799**
Office of Science	866	327	**1,193**	34	16	**51**
Environmental Management	8,945	339,744	**348,688**	1,074	4,200	**5,274**
Nuclear Energy	507	98	**605**	3	42	**45**
Power Marketing Administration	0	0	**0**	0	0	**0**
Others*	13	9	**22**	<0.5	<0.5	**<0.5**
TOTAL	**13,653**	**340,927**	**354,581**	**1,198**	**4,970**	**6,169**

Program	Hazardous§			TOTAL EXCLUDING SANITARY	Sanitary			GRAND TOTAL
	Routine Operations	Cleanup / Stabilization	Total Hazardous		Routine Operations	Cleanup / Stabilization	Total Sanitary	
Defense Programs	751	1,086	**1,837**	**6,823**	22,010	15,127	**37,137**	**43,960**
Office of Science	669	4,865	**5,534**	**6,785**	4,322	3,064	**7,387**	**14,171**
Environmental Management	500	7,154	**7,654**	**364,249**	11,649	17,975	**29,624**	**393,873**
Nuclear Energy	14	20	**34**	**684**	885	0	**885**	**1,569**
Power Marketing Administration	117	15	**133**	**133**	1,357	34	**1,391**	**1,524**
Others*	17	123	**140**	**162**	538	0	**538**	**700**
TOTAL	**2,067**	**13,264**	**15,331**	**378,835**	**40,761**	**36,200**	**76,961**	**455,796**

* Others include the Office of Civilian Radioactive Waste Management, Energy Efficiency and Renewable Energy, Office of Fossil Energy, and Office of Nonproliferation and National Security.

§ Excludes 11e(2) byproduct material (soil or other material contaminated by extraction or concentration of uranium or thorium). Two sites reported byproduct material in 1998. The Weldon Spring Site Remedial Action Project reported 215,500 cubic meters of low-level radioactive waste, 1,090 cubic meters of low-level mixed waste, and 19 metric tons of State regulated waste. The Grand Junction Projects Office reported 100 cubic meters of low-level radioactive waste.

Table A.10
1998 DOE Recycling Activities by Site (in Metric Tons)

Site	Paper Products	Metals[†]	Automotive	Other[††]	TOTAL [†††]
Oak Ridge Y-12 Plant	347	1,686	48	10,482	12,562
East Tennessee Technology Park	252	825	108	9,718	10,903
Los Alamos National Laboratory	390	1,700	91	6,578	8,759
Lawrence Livermore National Laboratory	572	1,434	55	4,851*	6,912
Hanford Site	476	1,633	102	4,668	6,879
Pantex Plant	10	215	71	6,071	6,367
Argonne National Laboratory - East	475	653	8	4,140	5,275
Savannah River Site	562	3,113	42	1,070	4,787
Sandia National Laboratories/New Mexico	498	356	114	3,781	4,749
Kansas City Plant	142	788	23	2,306**	3,259
Oak Ridge National Laboratory	333	483	31	2,231	3,079
Energy Technology Engineering Center	5	555	0	2,392	2,952
Western Area Power Administration	65	925	71	1,435	2,495
Fermi National Accelerator Laboratory	79	1,270	5	845	2,199
Nevada Test Site	256	1,336	131	16	1,739
Idaho National Engineering and Environmental Laboratory	260	784	127	242	1,412
Rocky Flats Environmental Technology Site	314	763	72[§]	131	1,280
Lawrence Berkeley National Laboratory	151	180	0	519[§§]	851
Brookhaven National Laboratory	274	73	10	493	849
Stanford Linear Accelerator Center	119	407	55	187	768
Strategic Petroleum Reserve Project Management Office	62	632	21	<0.5	715
Portsmouth Gaseous Diffusion Plant	19	615	0	5	639
Argonne National Laboratory - West	405	102	6	57	569
West Valley Demonstration Project	102	88	2	221	413
Yucca Mountain Site Characterization Office	272	1	36	64	372
Fernald Environmental Management Project	111	200	0	6	316
Battelle Columbus Laboratories	0	28	0	257	286
Pacific Northwest National Laboratory	178	4	0	43	225
Mound Plant	32	158	<0.5	1	191
Princeton Plasma Physics Laboratory	49	85	6	26	167
Sandia National Laboratories/California	37	117	5	6	165
Thomas Jefferson National Accelerator Facility	0	126	2	23	152
Waste Isolation Pilot Plant	72	53	8	<0.5	133
Federal Energy Technology Center - Pittsburgh	75	38	4	1	118
RMI Environmental Services	<0.5	12	<0.5	57	69
Grand Junction Projects Office	48	16	<0.5	1	65
Weldon Spring Site Remedial Action Project	17	0	31	1***	49
Office of Scientific and Technical Information	44	0	0	0	44
Oak Ridge Institute for Science and Education	14	4	1	1	20
Southwestern Power Administration	2	0	8	0	10
Inhalation Toxicology Laboratory	7	<0.5	0	<0.5	7
Paducah Gaseous Diffusion Plant	5	<0.5	0	0	5
Southeastern Power Administration	5	<0.5	0	<0.5	5
TOTAL	**7,134**	**21,457**	**1,294**	**62,926**	**92,812**

† Scrap metal, precious metal, and aluminum can quantities are added together in the "metals" column.

†† Other materials may also include: plastic, styrofoam, glass, toner cartridges, food/garden waste, concrete, wood, fluorescent light tubes, coolant, filters, solvents, photographic materials, ground circuit boards, chemicals, small animal exposure tubes, paint adhesives, brick, non-process wastewater, furniture/office equipment, engine coolant, and fly ash.

††† Quantities are estimates that have been rounded to the nearest whole number, assuming that one cubic meter is equivalent to one metric ton. Materials sent offsite for handling to be recycled by another party are not included in these estimates.

* Excludes 24,601 metric tons of recycled soil from the Lawrence Livermore National Laboratory as this activity is typically not considered pollution prevention because soil is ultimately disposed.

** Excludes 624 metric tons of recycled soil from the Kansas City Plant, as this activity is typically not considered pollution prevention because soil is ultimately disposed.

*** Excludes 53,357 tons of recycled aggregate at the Weldon Spring Site Remedial Action Project, as this activity is typically not considered pollution prevention because material is ultimately disposed.

§ This quantity includes the weight of batteries, many of which are non-automotive, i.e., emergency power supply batteries, emergency exit sign batteries, and fork-truck batteries.

§§ Excludes 397 metric tons of recycled soil from Lawrence Berkeley National Laboratory as this activity is typically not considered pollution prevention because soil is utimately disposed.

Figure A-1
1998 Routine Operations, Cleanup / Stabilization, and Sanitary Waste Generation by Operations / Field Office (in Cubic Meters)

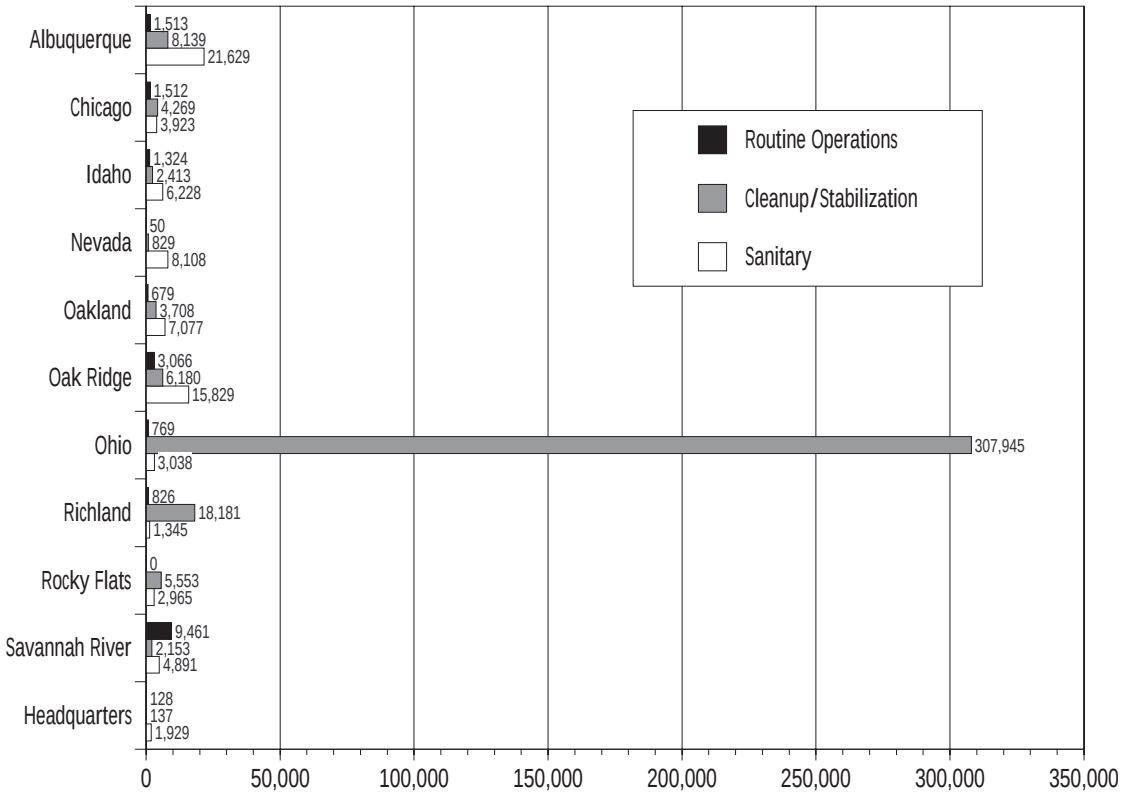
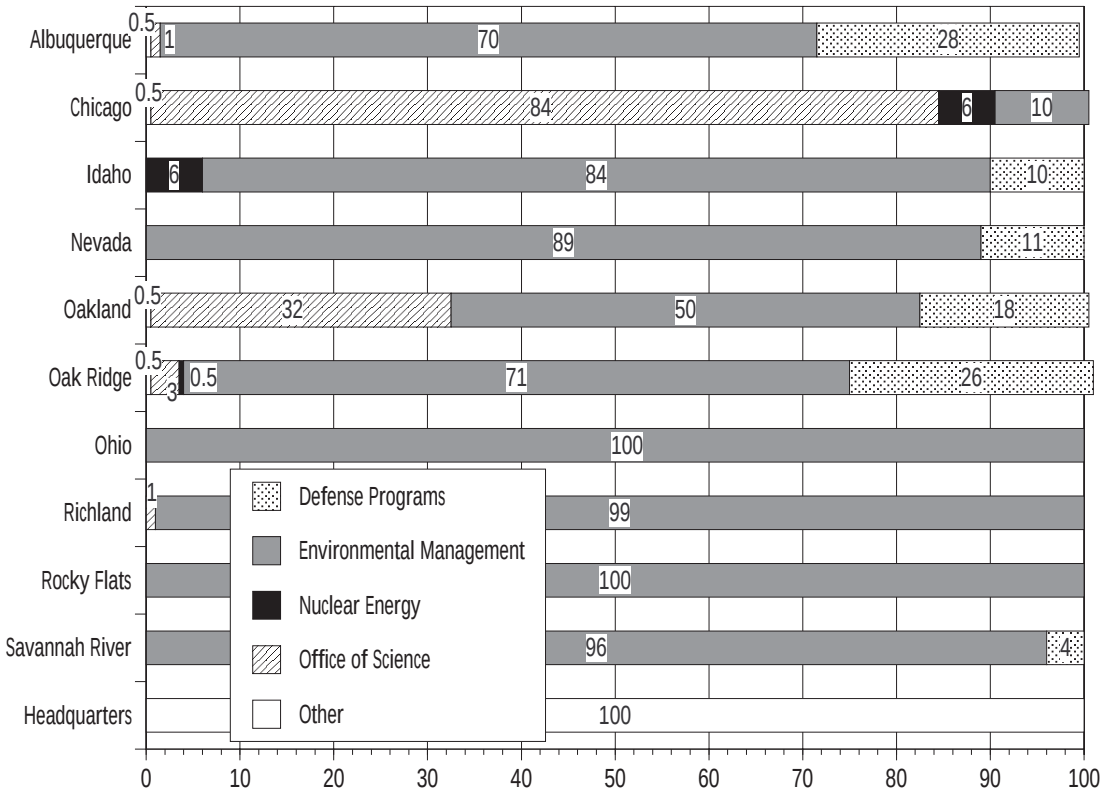


Figure A-2
1998 Program Routine Operations and Cleanup / Stabilization Waste Generation (Excluding Sanitary Waste) by Operations / Field Office (in Percent)



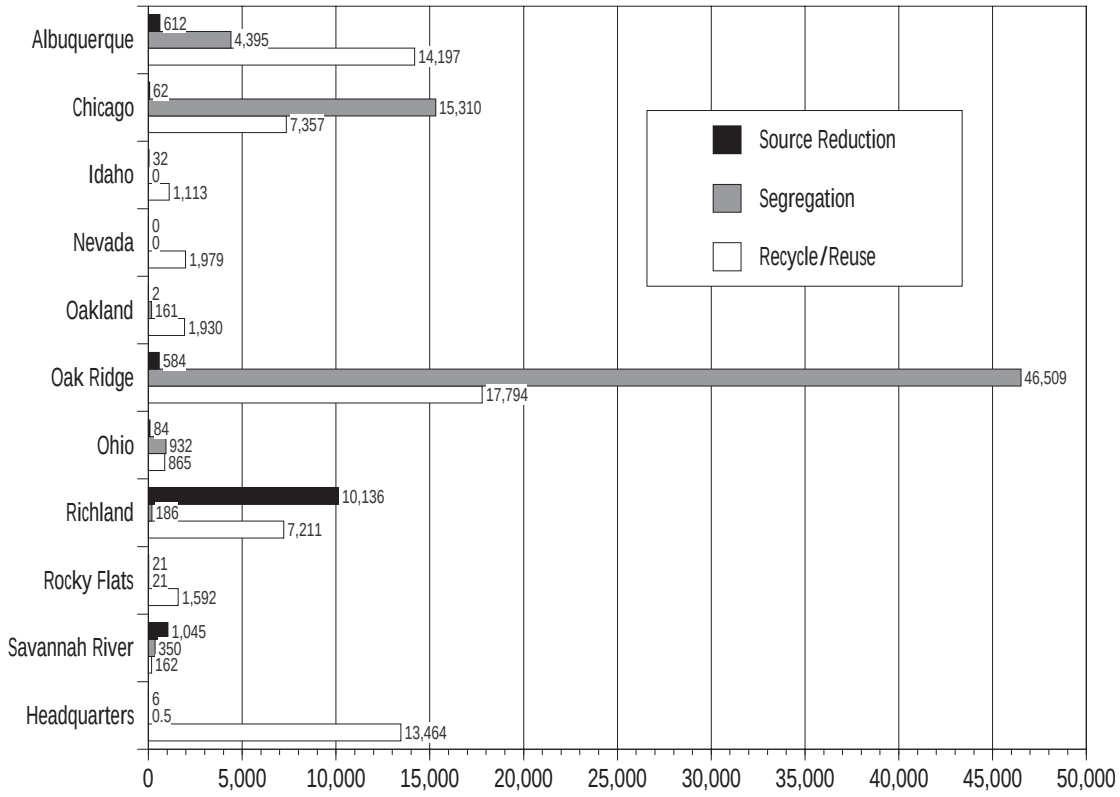


Figure A-3
1998 Waste Reduction from Pollution Prevention Projects by Operations/Field Office (in Metric Tons)

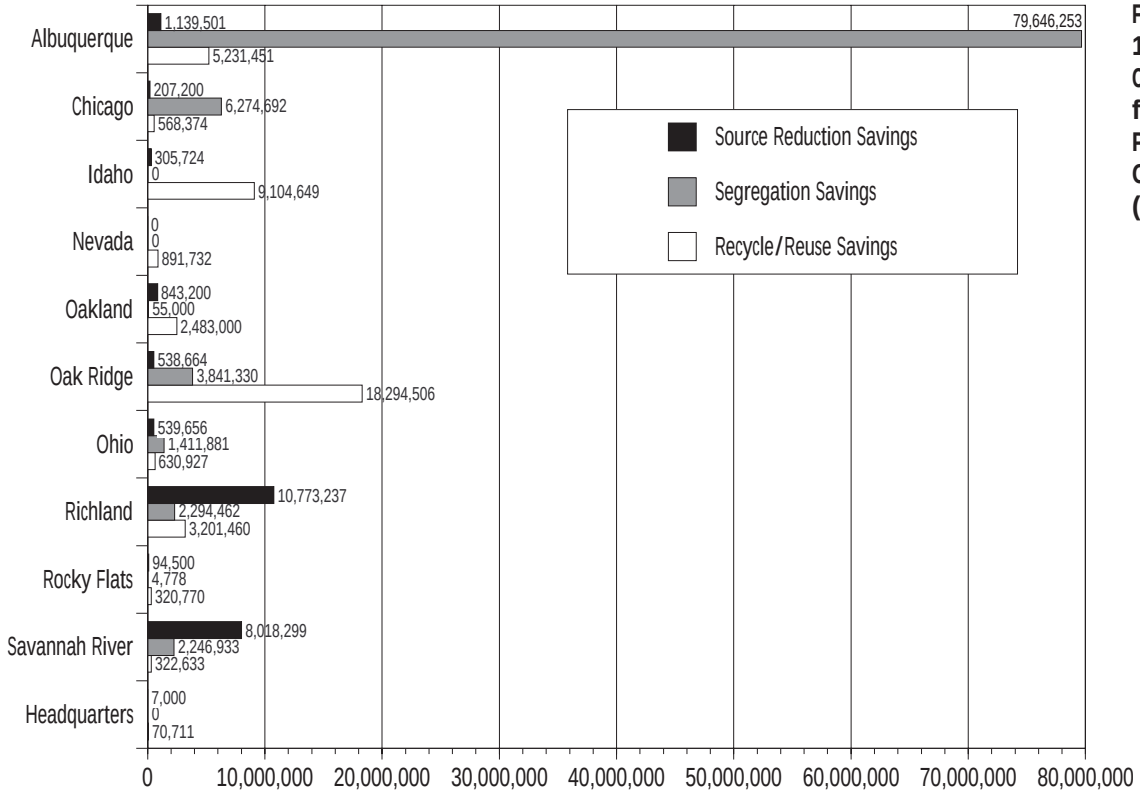
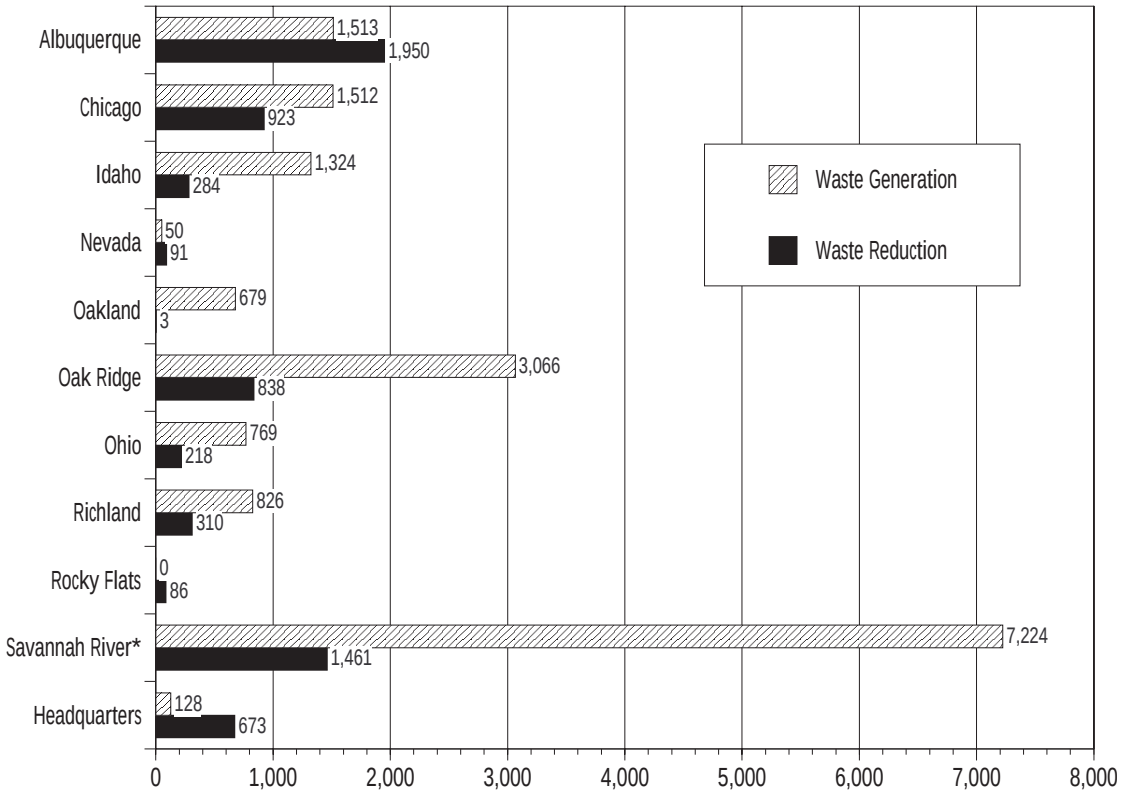


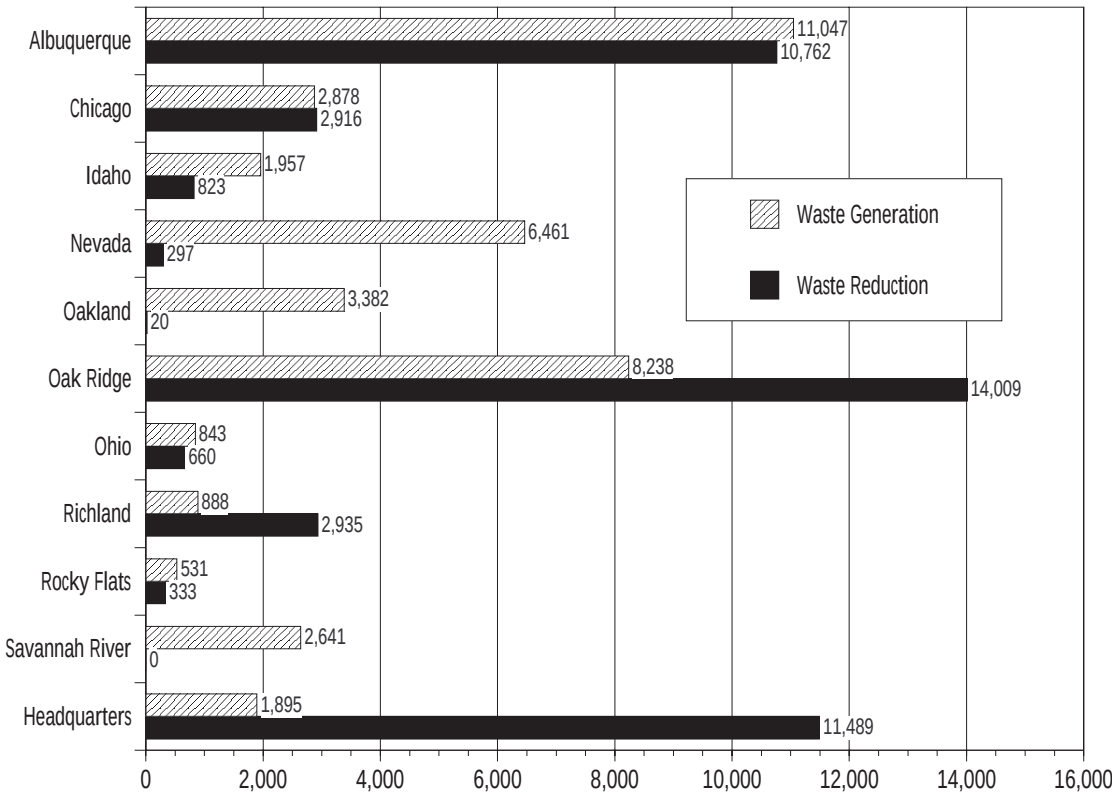
Figure A-4
1998 Total Reported Cost Savings/Avoidance from Pollution Prevention Projects by Operations/Field Office (in Dollars)

Figure A-5
1998 Routine Operations Waste Generation and Waste Reduction (Excluding Sanitary Waste) by Operations / Field Office (in Cubic Meters)



*Not including high-level waste.

Figure A-6
1998 Routine Operations Sanitary Waste Generation and Waste Reduction by Operations / Field Office (in Metric Tons)



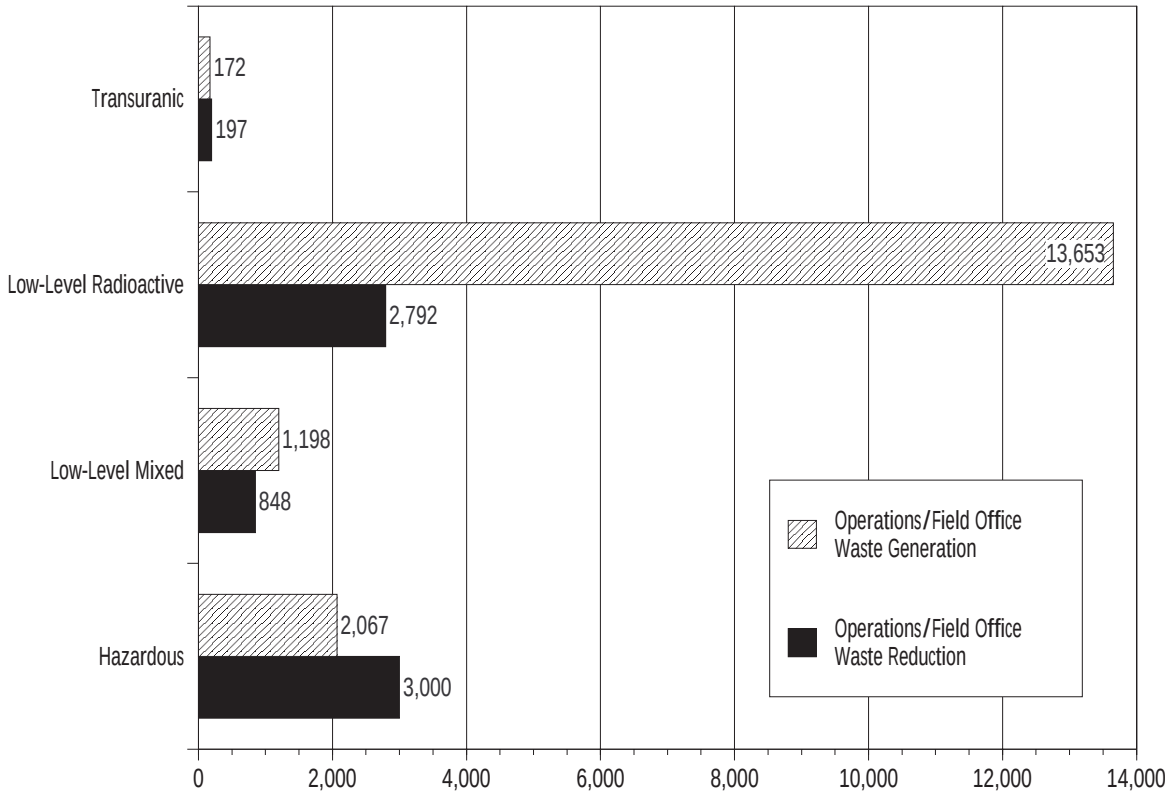


Figure A-7
1998 Routine Operations Waste Generation and Waste Reduction for All Operations/Field Offices by Waste Type (in Cubic Meters)

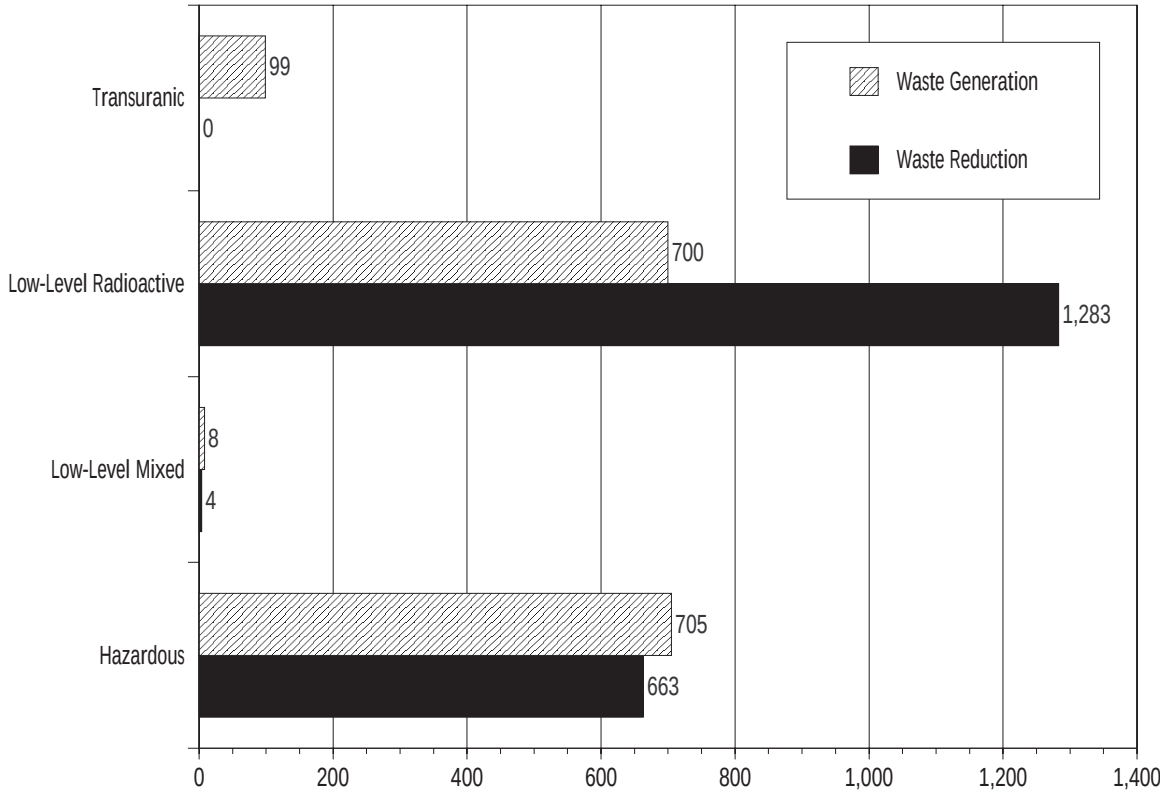


Figure A-8
Albuquerque Operations Office 1998 Routine Operations Waste Generation and Waste Reduction (in Cubic Meters)

Figure A-9 Chicago Operations Office 1998 Routine Operations Waste Generation and Waste Reduction (in Cubic Meters)

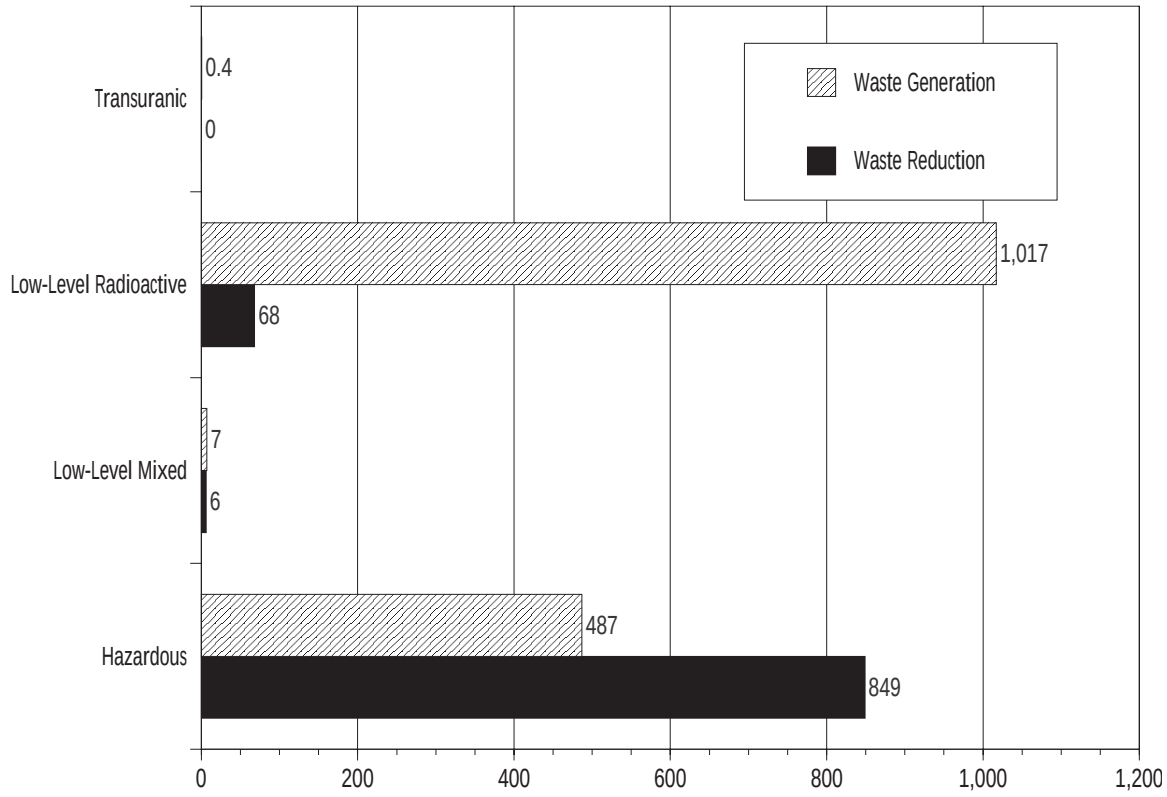
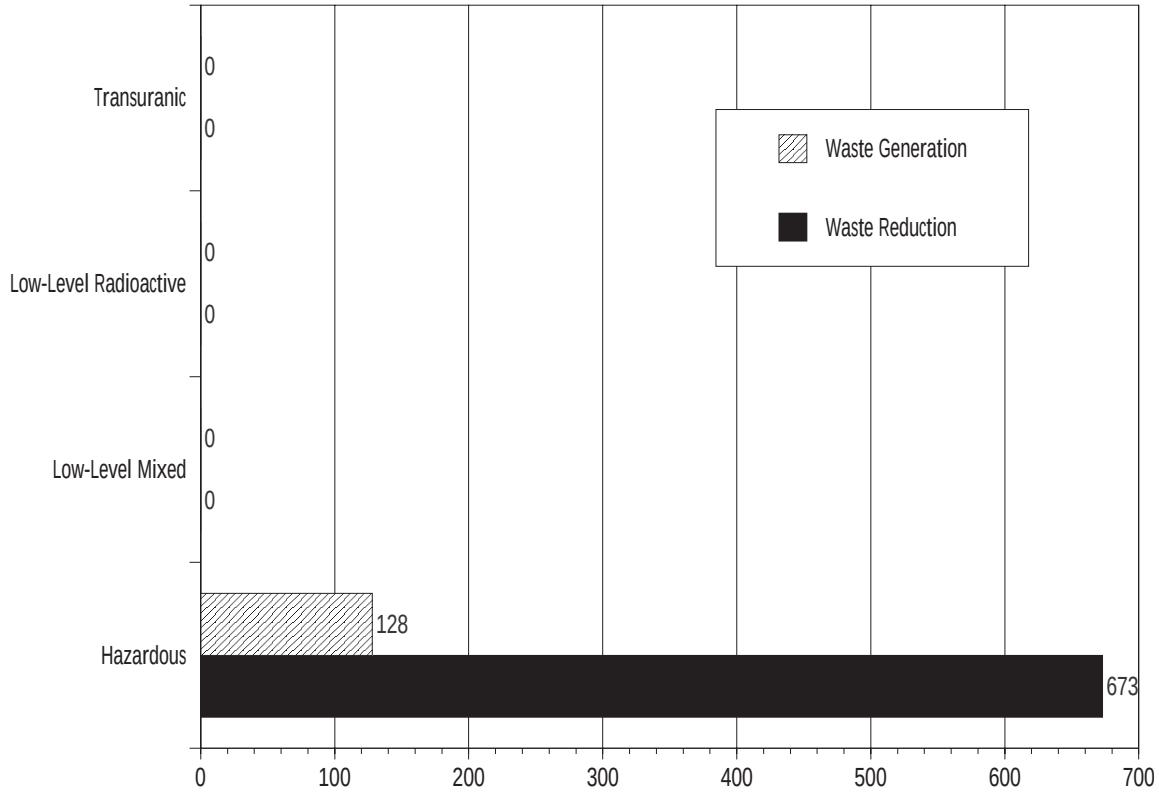


Figure A-10 Headquarters 1998 Routine Operations Waste Generation and Waste Reduction (in Cubic Meters)



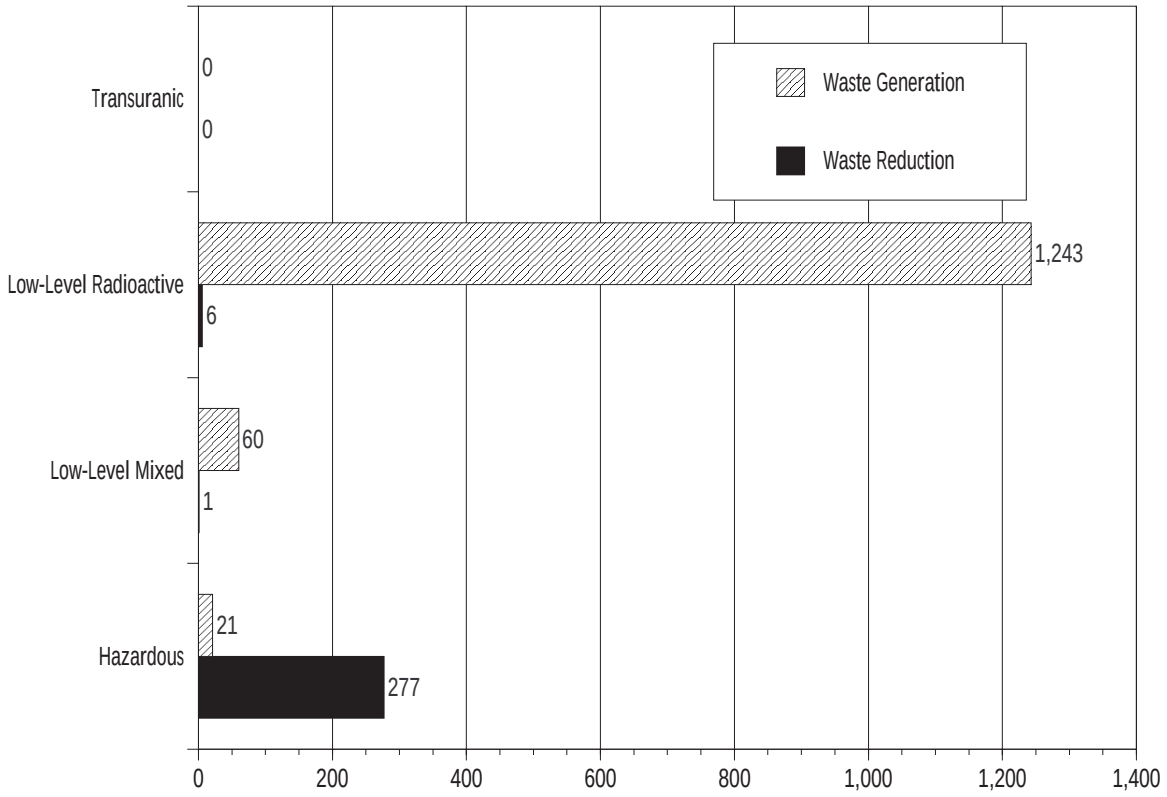


Figure A-11
Idaho Operations Office 1998 Routine Operations Waste Generation and Waste Reduction (in Cubic Meters)

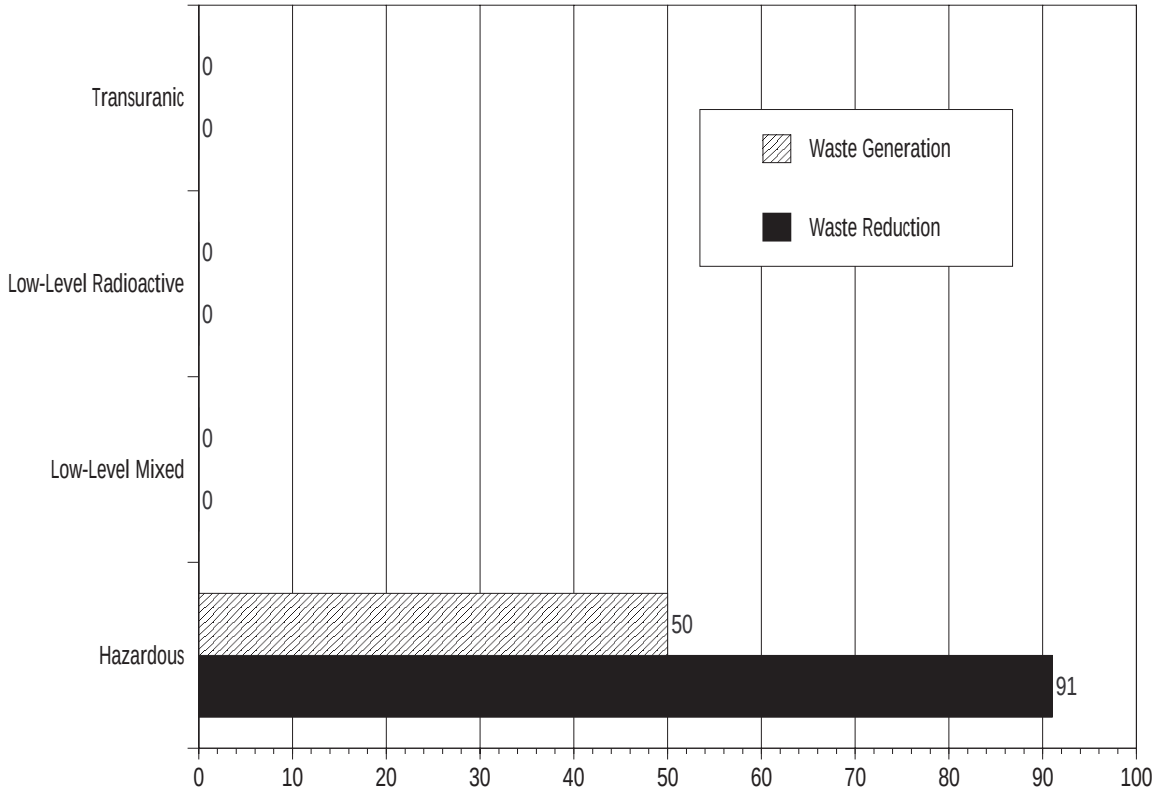


Figure A-12
Nevada Operations Office 1998 Routine Operations Waste Generation and Waste Reduction (in Cubic Meters)

Figure A-13
Oakland Operations Office 1998 Routine Operations Waste Generation and Waste Reduction (in Cubic Meters)

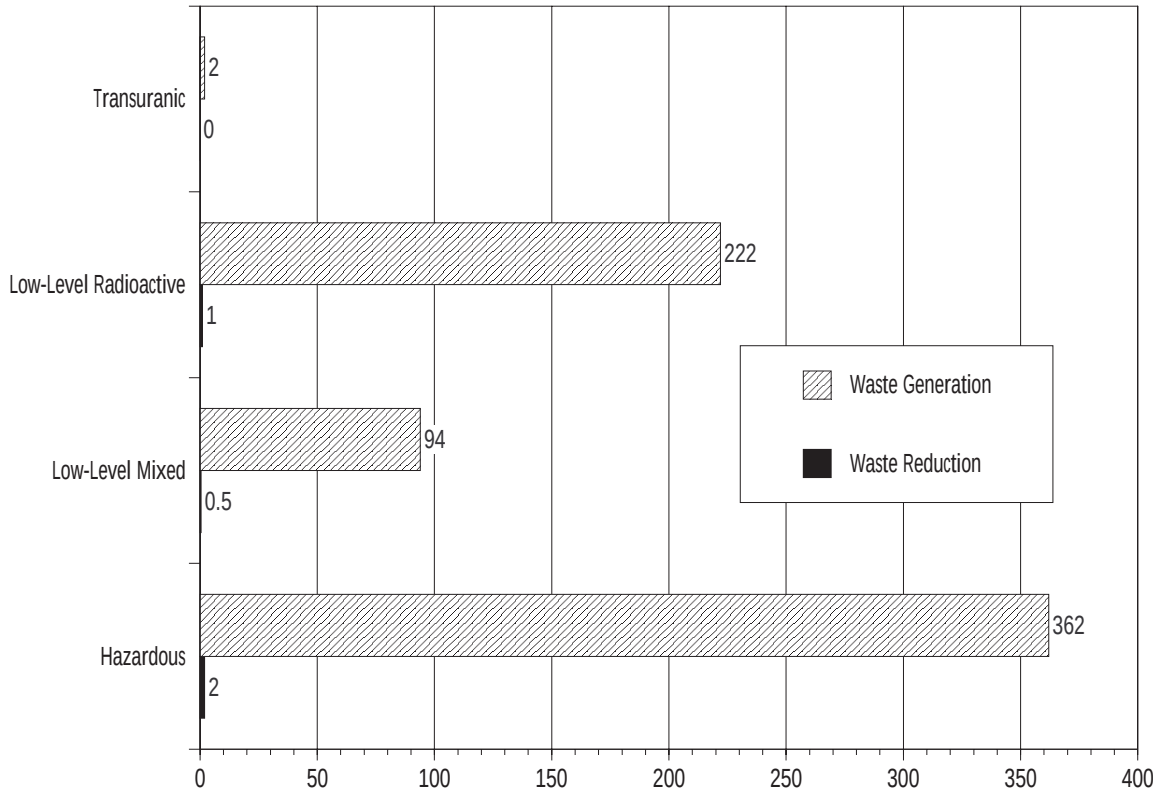
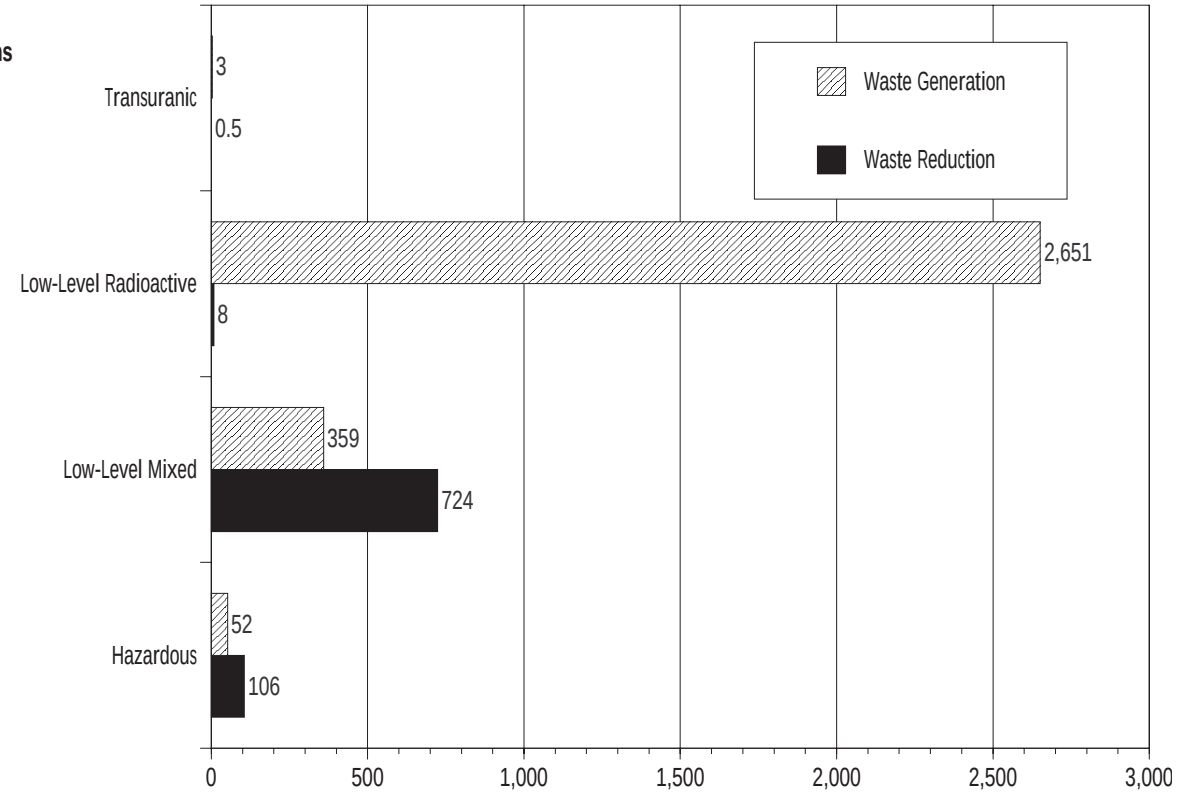


Figure A-14
Oak Ridge Operations Office 1998 Routine Operations Waste Generation and Waste Reduction (in Cubic Meters)



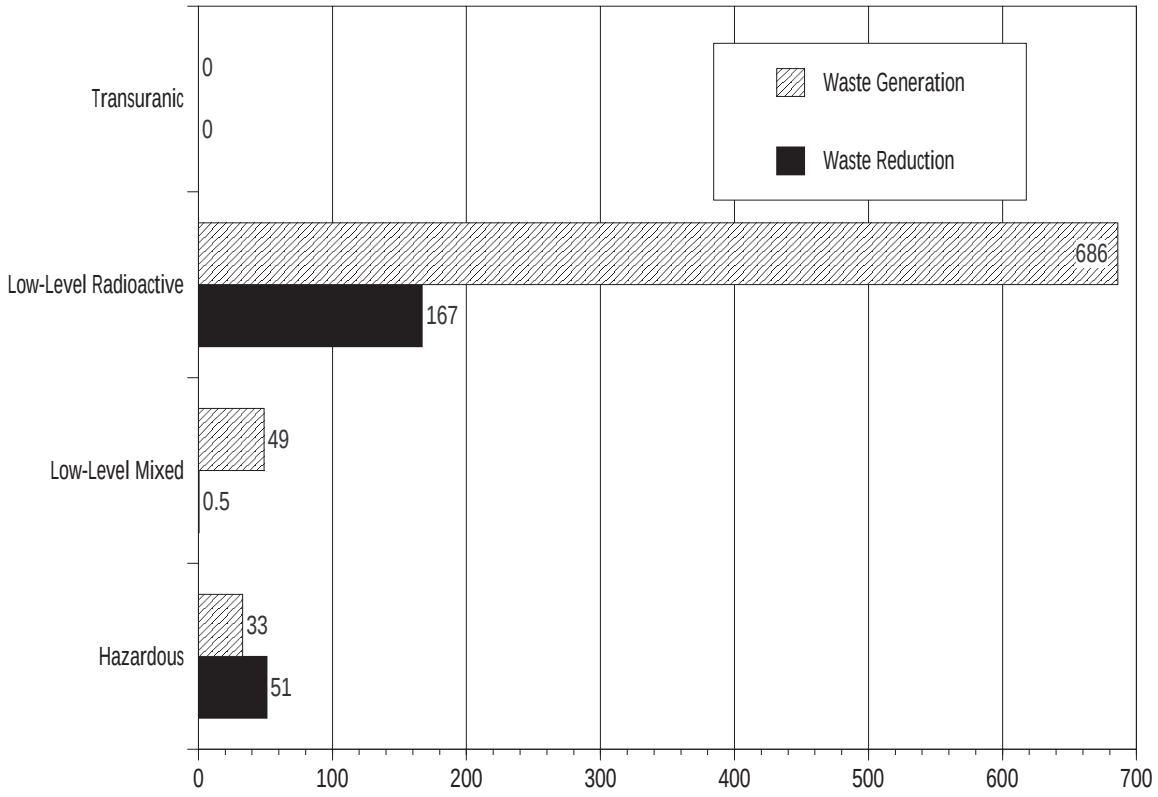


Figure A-15
Ohio Field Office 1998 Routine Operations Waste Generation and Waste Reduction (in Cubic Meters)

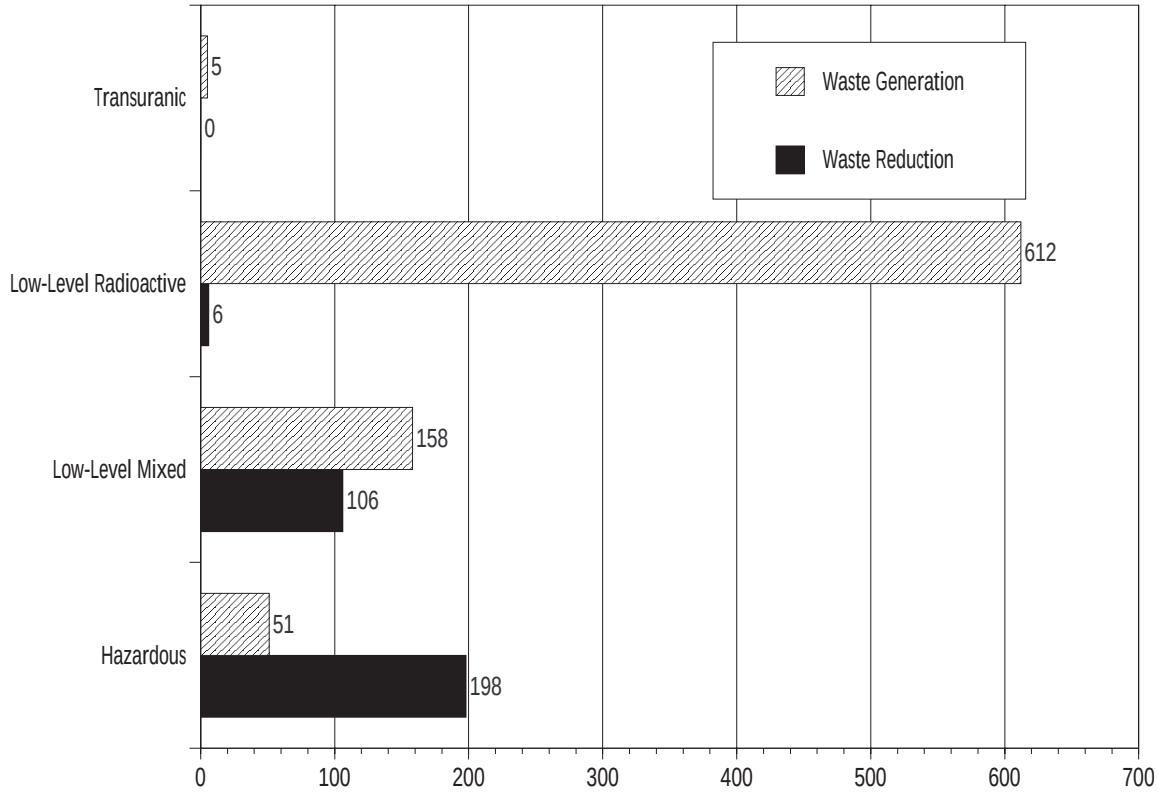


Figure A-16
Richland Operations Office 1998 Routine Operations Waste Generation and Waste Reduction (in Cubic Meters)

Figure A-17
Rocky Flats Field Office
1998 Routine
Operations Waste
Generation and
Waste Reduction
(in Cubic Meters)

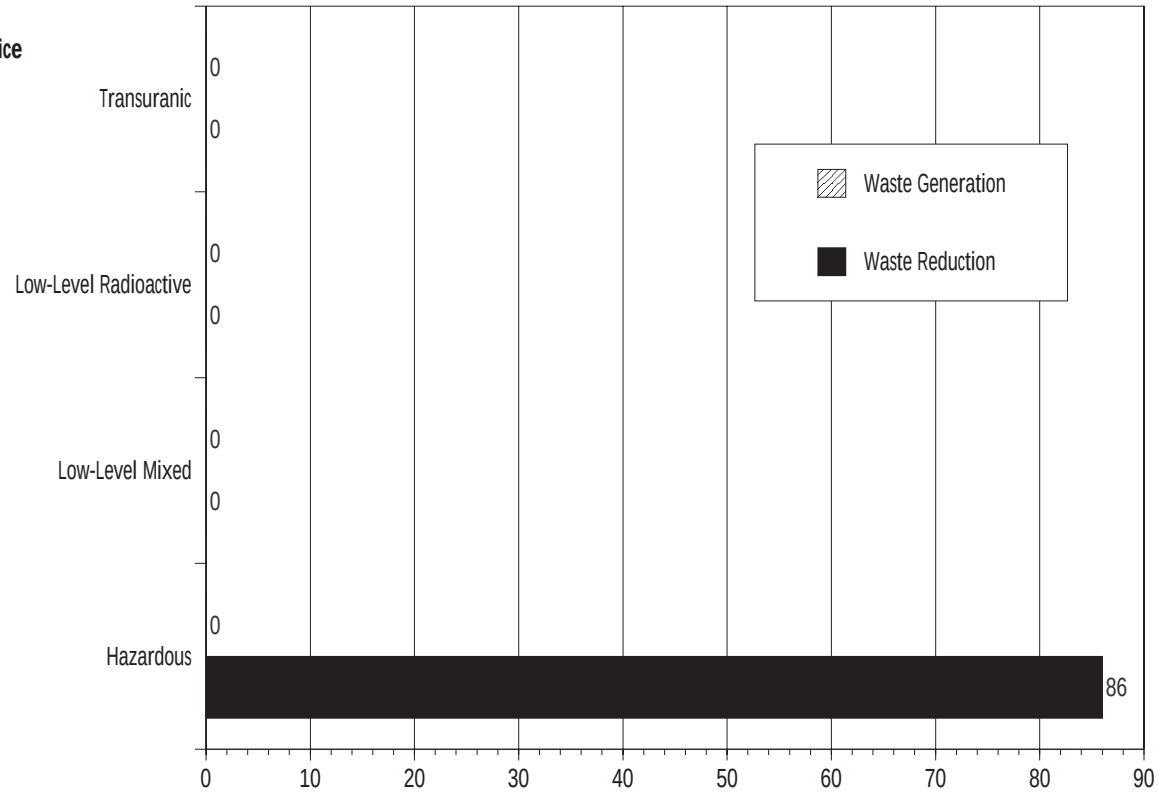
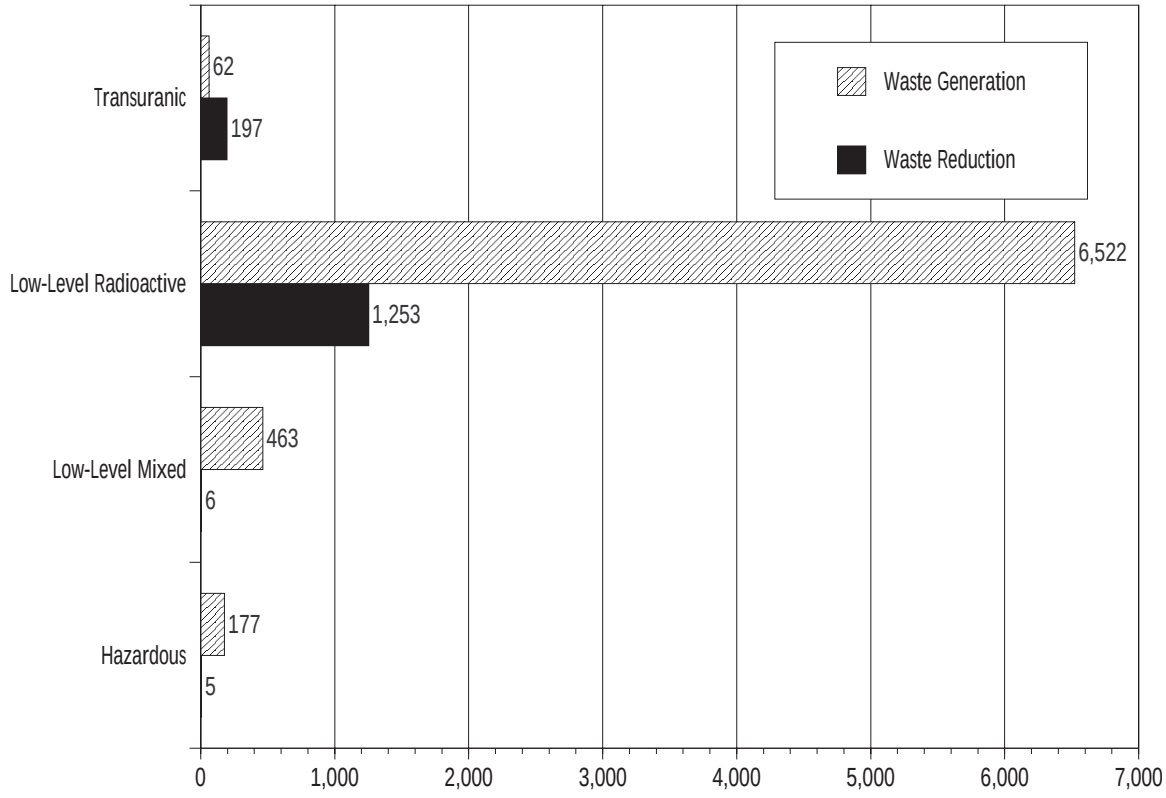


Figure A-18
Savannah River
Operations Office
1998 Routine
Operations Waste
Generation and
Waste Reduction
(in Cubic Meters)



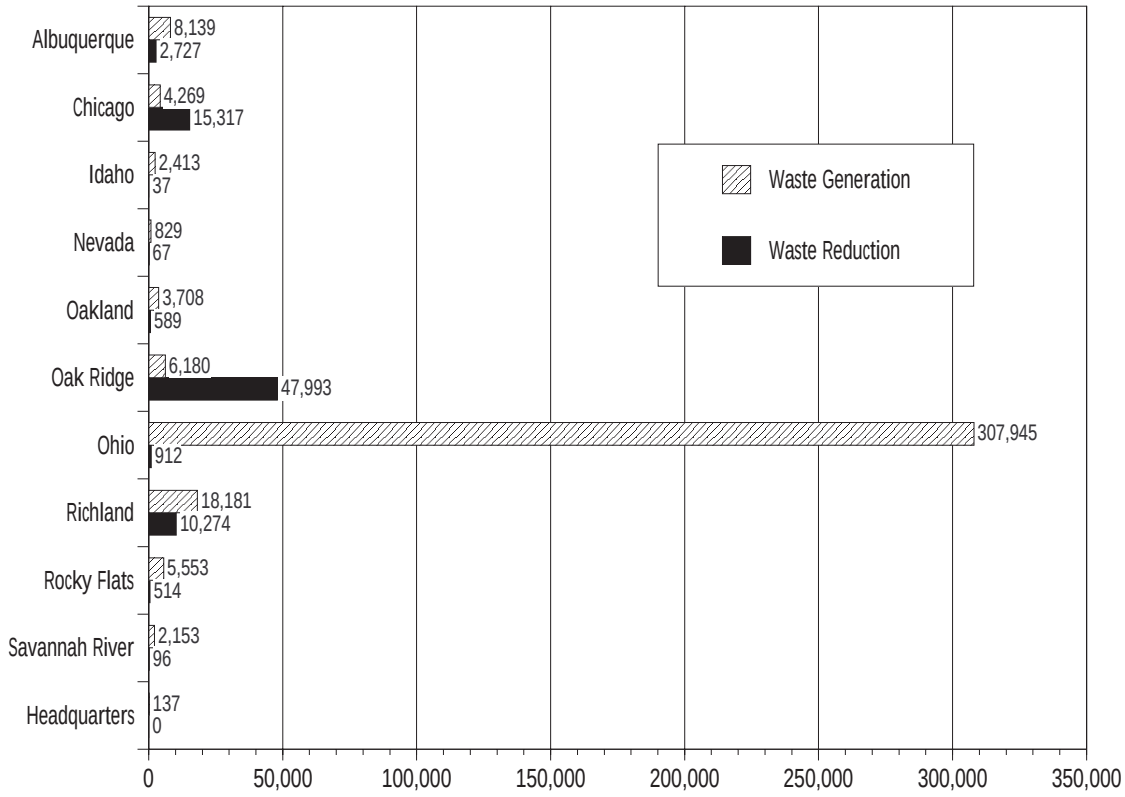


Figure A-19
1998 Cleanup / Stabilization Waste Generation and Waste Reduction (Excluding Sanitary Waste) by Operations / Field Office (in Cubic Meters)

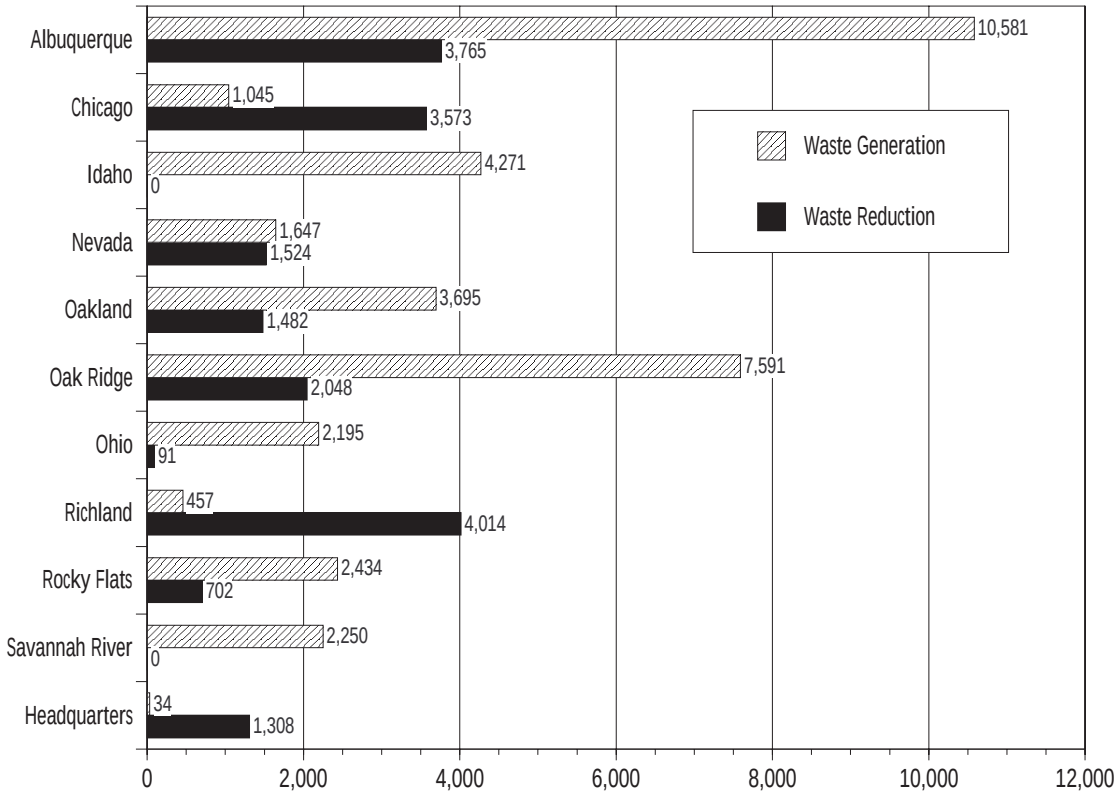


Figure A-20
1998 Cleanup / Stabilization Sanitary Waste Generation and Waste Reduction by Operations / Field Office (in Metric Tons)

Figure A-21
1998 Cleanup / Stabilization Waste Generation and Waste Reduction for All Operations / Field Offices by Waste Type (in Cubic Meters)

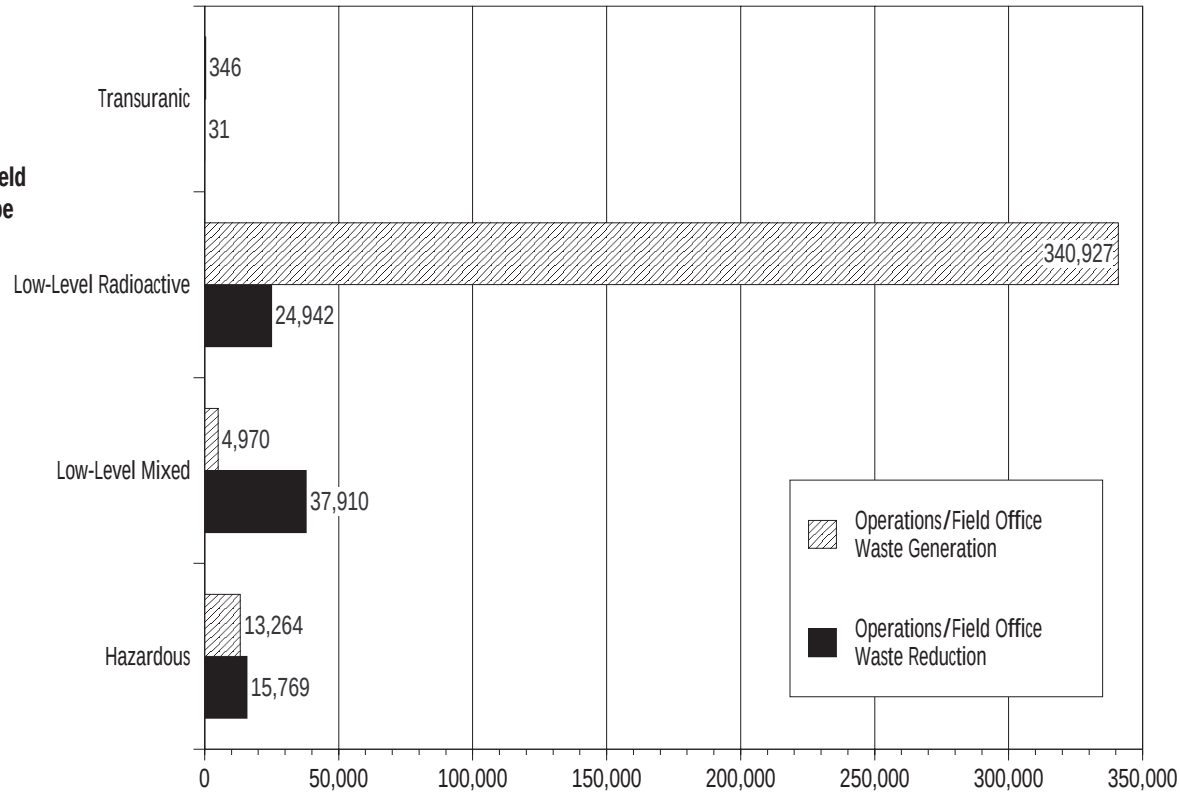
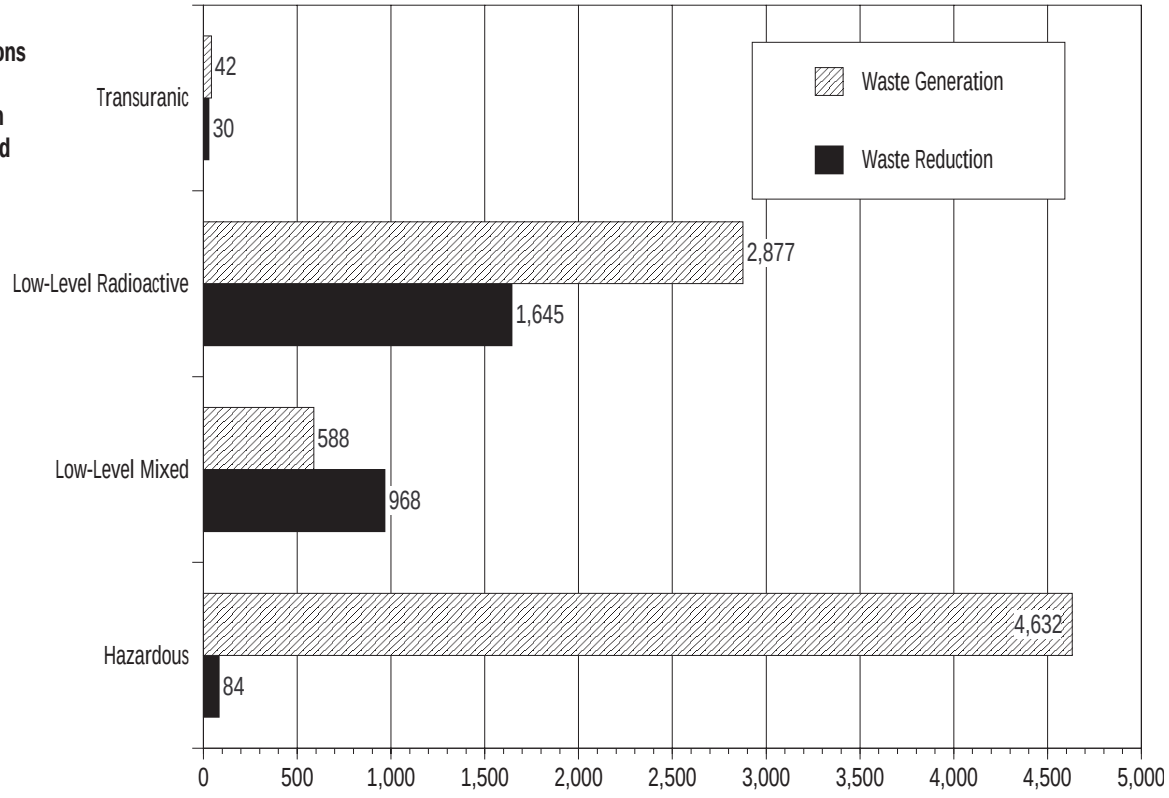


Figure A-22
Albuquerque Operations Office 1998 Cleanup / Stabilization Waste Generation and Waste Reduction (in Cubic Meters)



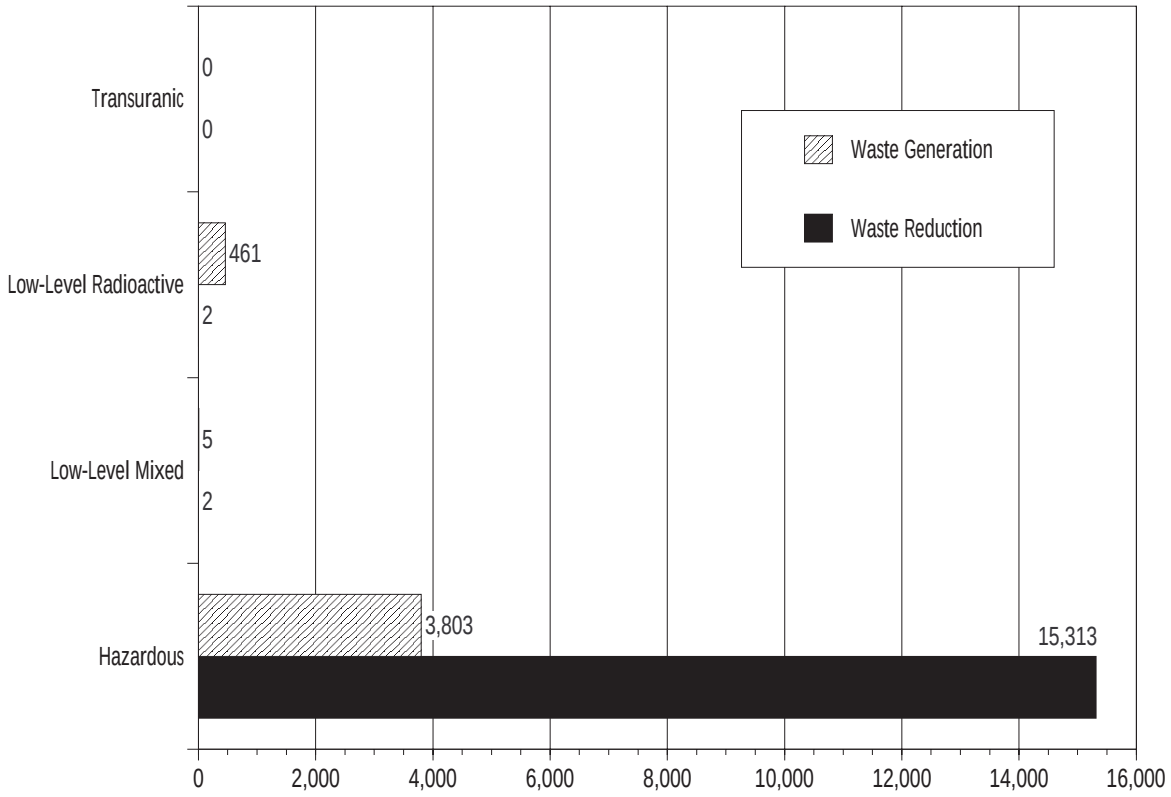


Figure A-23
Chicago Operations Office 1998 Cleanup / Stabilization Waste Generation and Waste Reduction (in Cubic Meters)

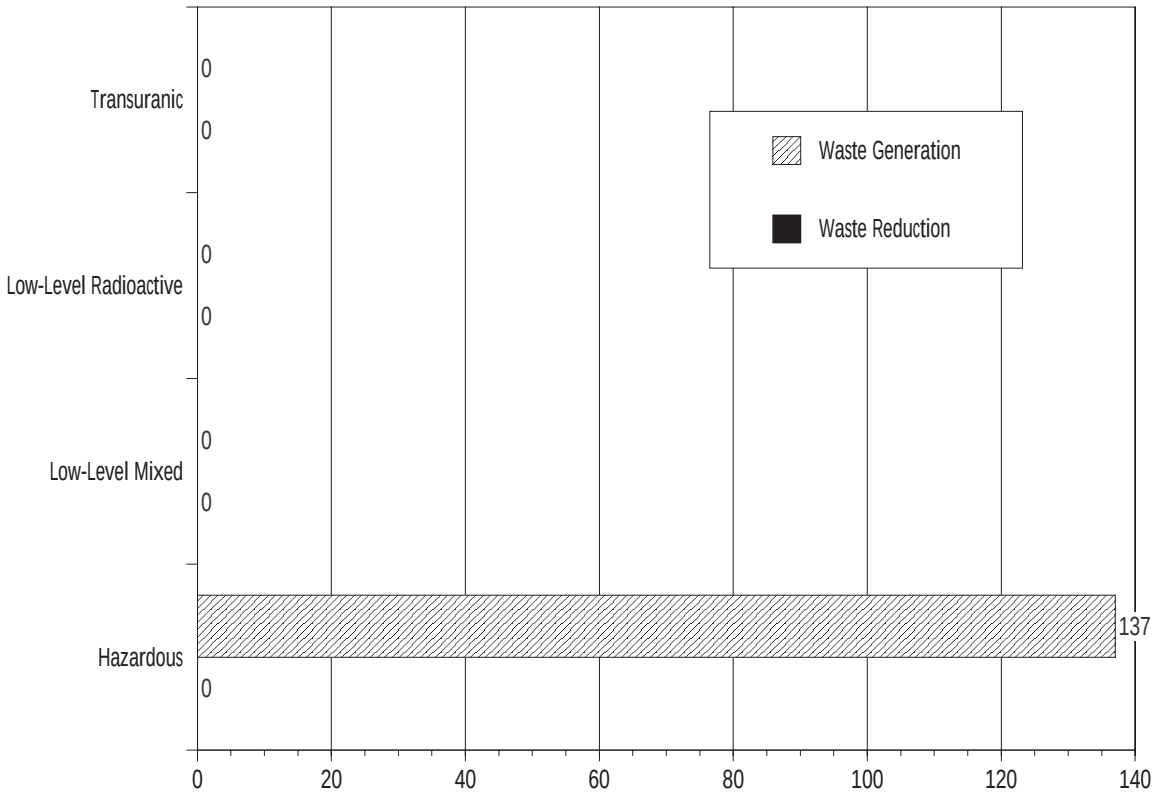


Figure A-24
Headquarters 1998 Cleanup / Stabilization Waste Generation and Waste Reduction (in Cubic Meters)

Figure A-25
Idaho Operations Office 1998 Cleanup / Stabilization Waste Generation and Waste Reduction (in Cubic Meters)

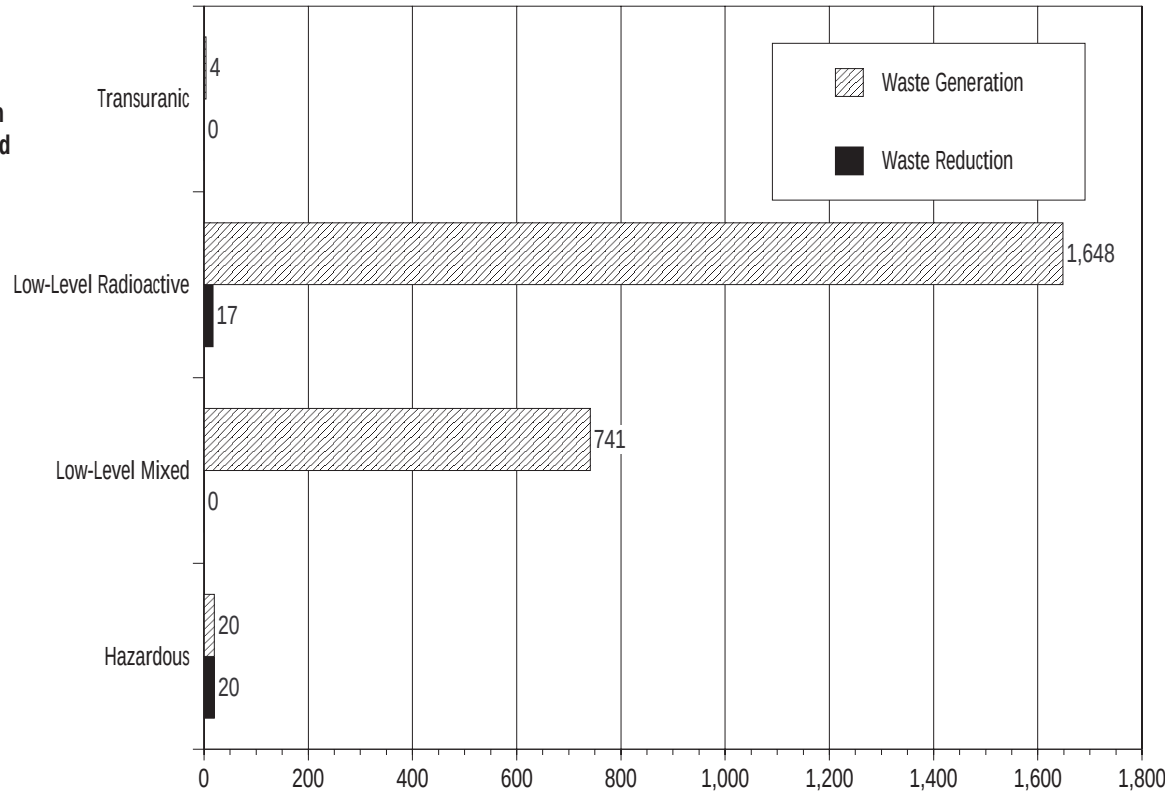
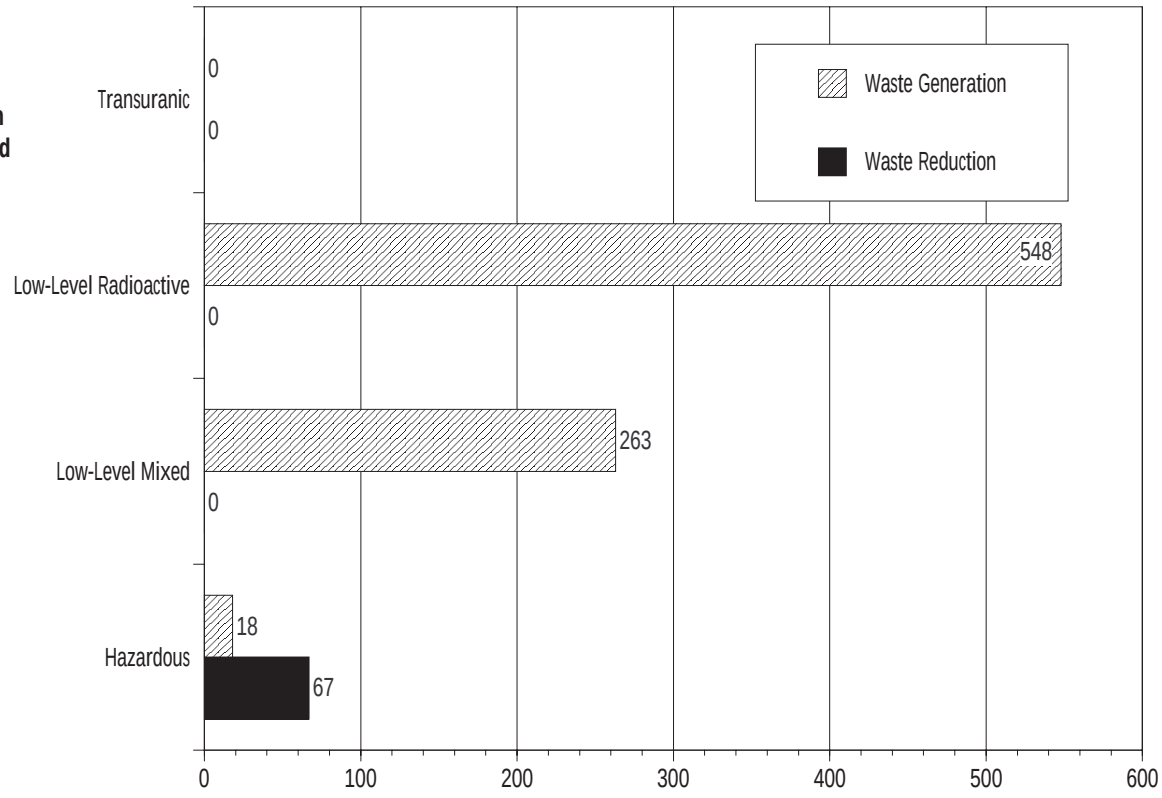


Figure A-26
Nevada Operations Office 1998 Cleanup / Stabilization Waste Generation and Waste Reduction (in Cubic Meters)



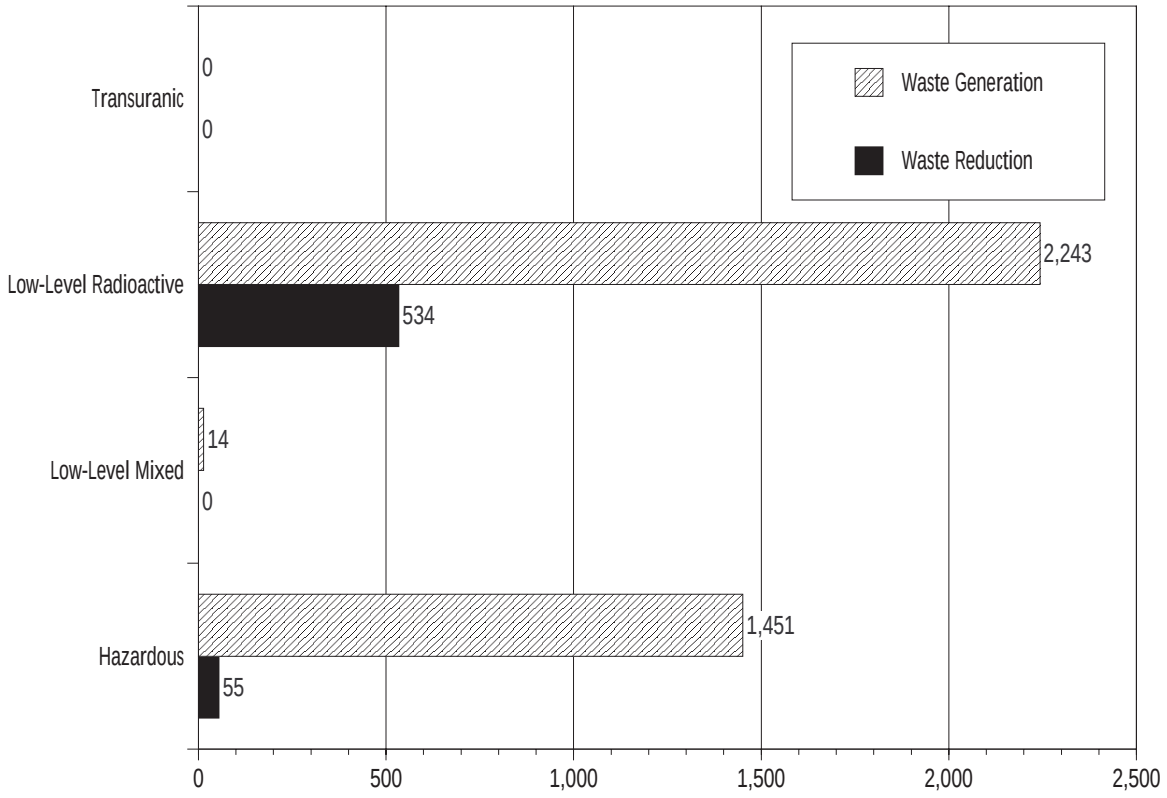


Figure A-27
Oakland Operations Office 1998 Cleanup / Stabilization Waste Generation and Waste Reduction (in Cubic Meters)

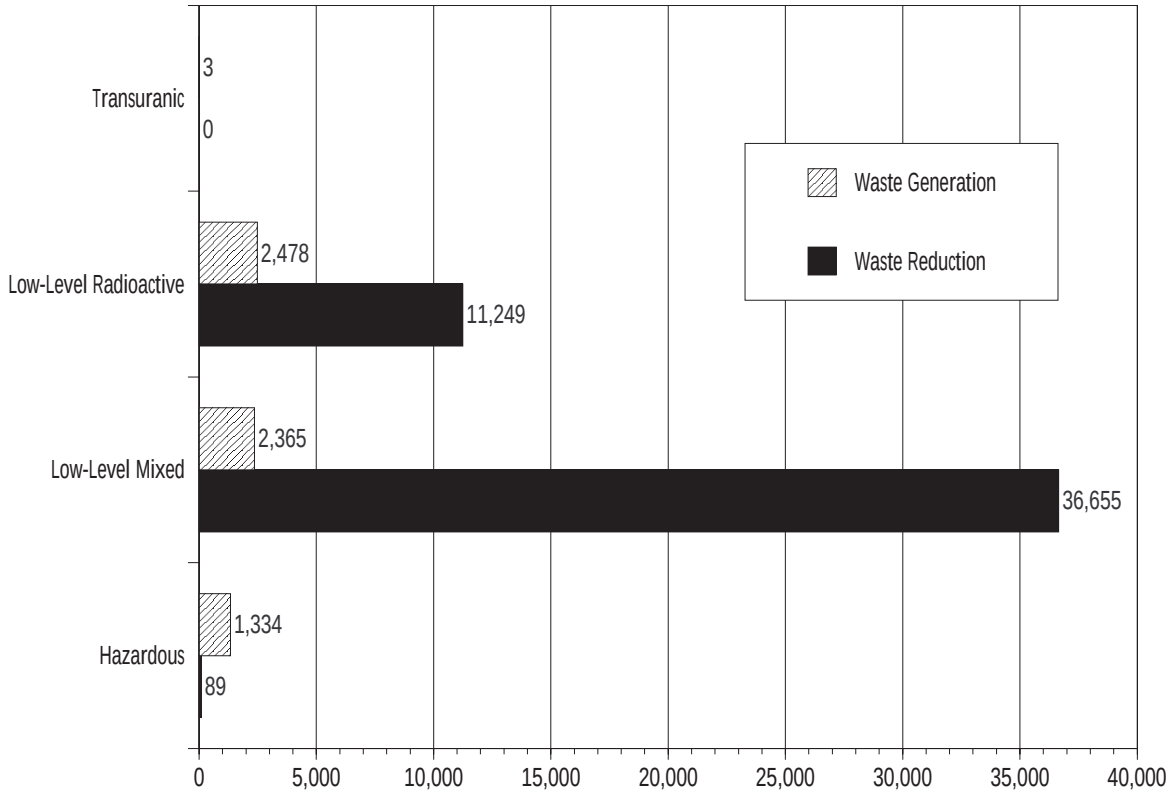


Figure A-28
Oak Ridge Operations Office 1998 Cleanup / Stabilization Waste Generation and Waste Reduction (in Cubic Meters)

Figure A-29
Ohio Field Office 1998 Cleanup / Stabilization Waste Generation and Waste Reduction (in Cubic Meters)

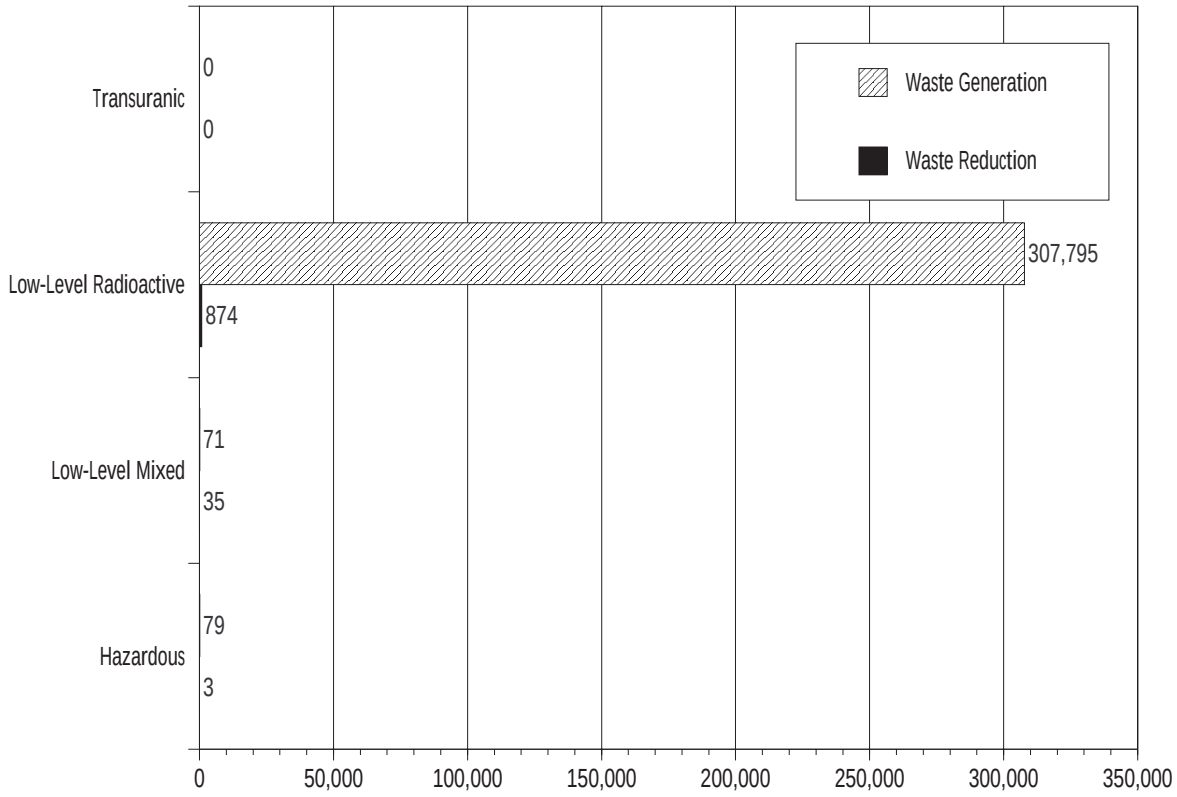
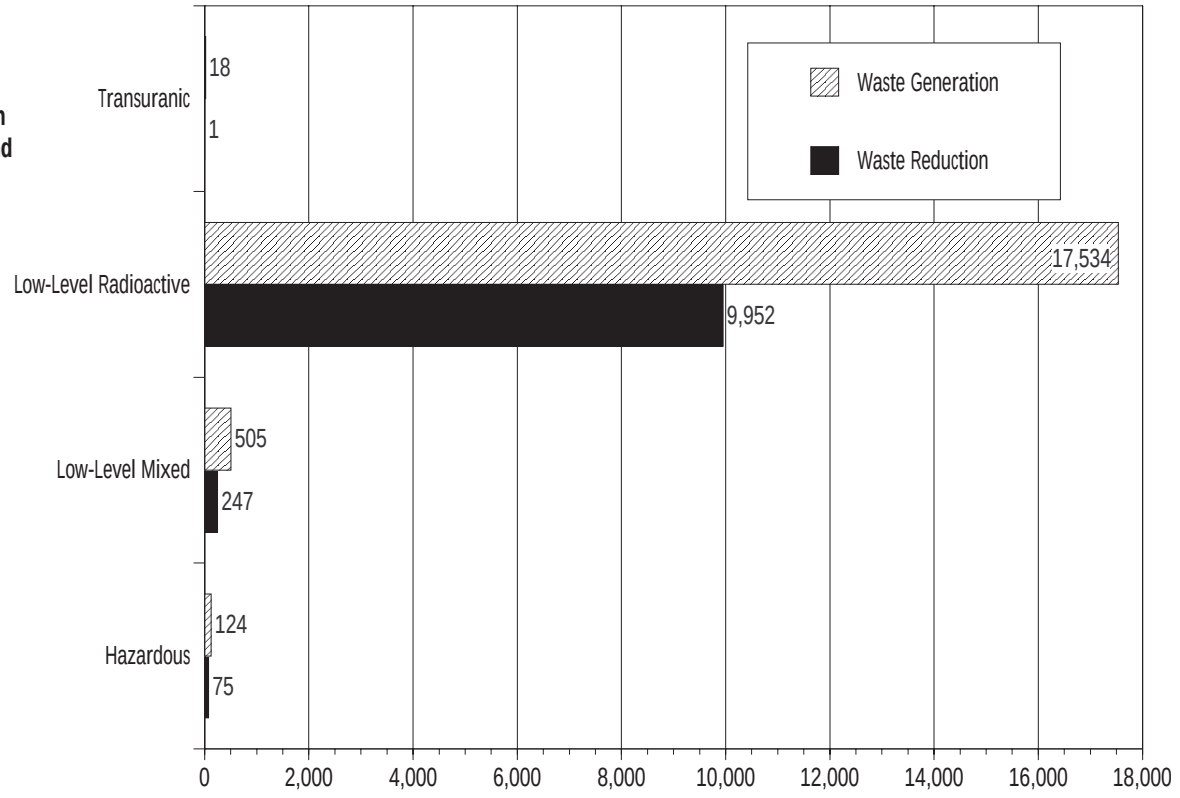


Figure A-30
Richland Operations Office 1998 Cleanup / Stabilization Waste Generation and Waste Reduction (in Cubic Meters)



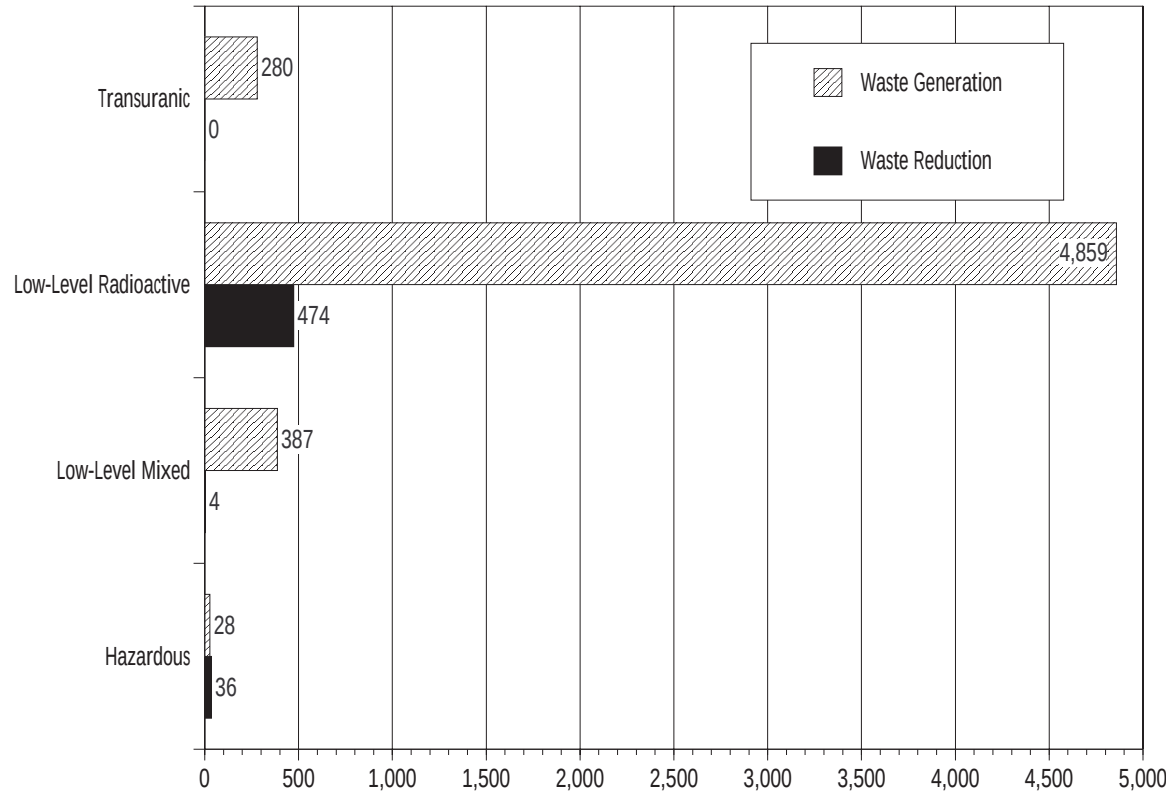


Figure A-31
Rocky Flats Field Office
1998 Cleanup / Stabilization Waste Generation and Waste Reduction (in Cubic Meters)

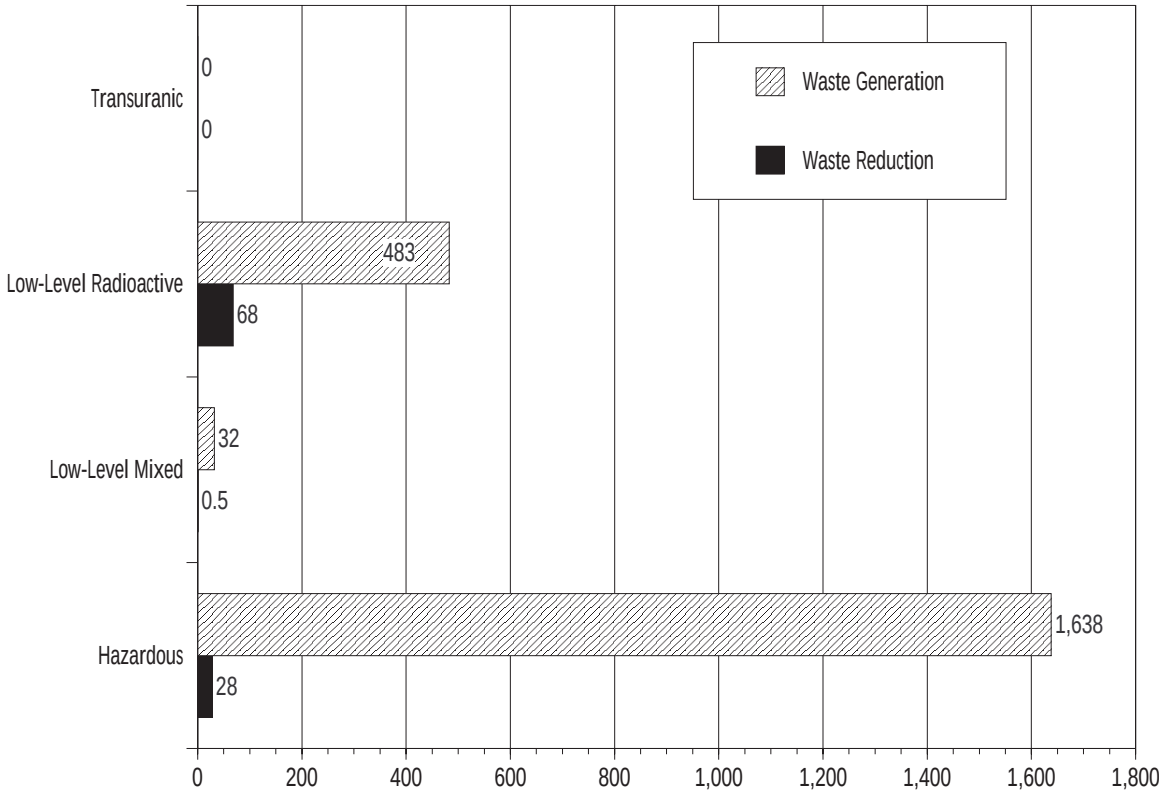


Figure A-32
Savannah River Operations Office
1998 Cleanup / Stabilization Waste Generation and Waste Reduction (in Cubic Meters)

Appendix B

Affirmative Procurement

On September 14, 1998, President Clinton issued Executive Order 13101, *Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition*, requiring all federal agencies to increase their effort in waste prevention, recycling, and the purchase of environmentally preferable products (also called Affirmative Procurement). Executive Order 13101 supercedes Executive Order 12873, *Federal Acquisition, Recycling and Waste Prevention*, and requires federal agencies to set goals for solid waste prevention and recycling for the years 2000, 2005, and 2010. Federal agencies should also incorporate the recycle/reuse of pallets and the collection of toner cartridges for remanufacturing into their recycling programs, set goals to increase the procurement of products made with recovered materials, and increase the use of environmentally preferable products and services.

The following tables present DOE's Affirmative Procurement data by Operations/Field Office or Program Office for Fiscal Year 1998. This information is also available on the Executive Order 13101 Web site at http://gerweb.bdm.com/cfdocs/aprs/sitetotl.htm.

Table B-1
DOE Fiscal Year 1998
Affirmative Procurement
Purchases

Category	Total	With Recovered Content	Percent With Recovered Content	Adjusted Total ‡	Adjusted Percent With Recovered Content ‡
Construction Products	$ 7,638,007	$ 3,424,864	45%	$ 3,816,560	90%
Landscaping Products	$ 3,391	$ 3,391	100%	$ 3,391	100%
Non-Paper Office	$ 7,038,755	$ 4,053,573	58%	$ 4,815,100	84%
Paper Products	$ 15,310,692	$ 10,466,540	68%	$ 11,960,906	88%
Transportation Products	$ 52,950	$ 45,118	85%	$ 45,118	100%
Vehicular Products	$ 1,683,889	$ 248,055	15%	$ 697,682	36%
GRAND TOTALS	**$ 31,727,684**	**$ 18,241,541**	**57%**	**$ 21,338,757**	**85%**
Construction Products	$ 1,133,082	$ 786,766	69%	$ 954,524	82%
Landscaping Products	$ —	$ —	NA	$ —	NA
Non-Paper Office	$ 1,638,569	$ 605,242	37%	$ 780,032	78%
Paper Products	$ 3,294,592	$ 1,414,265	44%	$ 2,238,363	63%
Transportation Products	$ 235	$ —	0%	$ —	NA
Vehicular Products	$ 248,849	$ 19,408	8%	$ 69,367	28%
ALBUQUERQUE TOTALS	**$ 6,270,327**	**$ 2,825,681**	**45%**	**$ 4,042,286**	**70%**
Construction Products	$ 1,144,949	$ 960,302	84%	$ 968,449	99%
Landscaping Products	$ 750	$ 750	100%	$ 750	100%
Non-Paper Office	$ 479,698	$ 239,762	50%	$ 305,409	79%
Paper Products	$ 1,157,457	$ 648,552	56%	$ 668,010	97%
Transportation Products	$ 557	$ —	0%	$ —	NA
Vehicular Products	$ 81,707	$ 12,642	15%	$ 64,252	20%
CHICAGO TOTALS	**$ 2,865,118**	**$ 1,862,008**	**65%**	**$ 2,006,870**	**93%**
Construction Products	$ 79,244	$ 76,135	96%	$ 78,073	98%
Landscaping Products	$ —	$ —	NA	$ —	NA
Non-Paper Office	$ 25,741	$ 8,319	32%	$ 17,675	47%
Paper Products	$ 83,962	$ 12,768	15%	$ 38,845	33%
Transportation Products	$ —	$ —	NA	$ —	NA
Vehicular Products	$ 18,145	$ 780	4%	$ 18,145	4%
FOSSIL ENERGY TOTALS	**$ 207,056**	**$ 98,002**	**47%**	**$ 152,738**	**64%**

‡ Excludes the purchase of items for which a recycled product was not available at a competitive price or did not meet performance standards.

Table B-1 (Continued)
DOE Fiscal Year 1998
Affirmative Procurement
Purchases

Category	Total	With Recovered Content	Percent With Recovered Content	Adjusted Total ‡	Adjusted Percent With Recovered Content ‡
Construction Products	$ —	$ —	NA	$ —	NA
Landscaping Products	$ —	$ —	NA	$ —	NA
Non-Paper Office	$ 34,365	$ 33,778	98%	$ 33,909	100%
Paper Products	$ 62,800	$ 62,420	99%	$ 62,670	100%
Transportation Products	$ —	$ —	NA	$ —	NA
Vehicular Products	$ —	$ —	NA	$ —	NA
GOLDEN FIELD OFFICE TOTALS	**$ 97,165**	**$ 96,198**	**99%**	**$ 96,579**	**100%**
Construction Products	$ 18,343	$ —	0%	$ —	NA
Landscaping Products	$ —	$ —	NA	$ —	NA
Non-Paper Office	$ 136,087	$ 136,087	100%	$ 136,087	100%
Paper Products	$ 366,785	$ 324,237	88%	$ 324,237	100%
Transportation Products	$ —	$ —	NA	$ —	NA
Vehicular Products	$ 201,884	$ 13,089	6%	$ 13,089	100%
IDAHO TOTALS	**$ 723,099**	**$ 473,413**	**65%**	**$ 473,413**	**100%**
Construction Products	$ 994,455	$ 136,591	14%	$ 146,691	93%
Landscaping Products	$ —	$ —	NA	$ —	NA
Non-Paper Office	$ 464,022	$ 378,408	82%	$ 378,408	100%
Paper Products	$ 447,614	$ 435,095	97%	$ 435,095	100%
Transportation Products	$ 1,711	$ 1,711	100%	$ 1,711	100%
Vehicular Products	$ 3,186	$ 371	12%	$ 371	100%
NAVAL REACTORS TOTALS	**$ 1,910,988**	**$ 952,176**	**50%**	**$ 962,276**	**99%**
Construction Products	$ 35,276	$ 35,276	100%	$ 35,276	100%
Landscaping Products	$ —	$ —	NA	$ —	NA
Non-Paper Office	$ 186,752	$ 72,836	39%	$ 186,752	39%
Paper Products	$ 376,570	$ 369,867	98%	$ 376,570	98%
Transportation Products	$ —	$ —	NA	$ —	NA
Vehicular Products	$ 327,207	$ 66,087	20%	$ 327,207	20%
NEVADA TOTALS	**$ 925,805**	**$ 544,066**	**59%**	**$ 925,805**	**59%**

‡ Excludes the purchase of items for which a recycled product was not available at a competitive price or did not meet performance standards.

Table B-1 (Continued)
DOE Fiscal Year 1998
Affirmative Procurement Purchases

Category	Total	With Recovered Content	Percent With Recovered Content	Adjusted Total ‡	Adjusted Percent With Recovered Content ‡
Construction Products	$ 2,654,725	$ 637,774	25%	$ 739,641	91%
Landscaping Products	$ 2,300	$ 2,300	100%	$ 2,300	100%
Non-Paper Office	$ 947,914	$ 328,689	35%	$ 328,689	100%
Paper Products	$ 2,516,458	$ 1,671,095	66%	$ 1,671,095	100%
Transportation Products	$ 1,138	$ 1,138	100%	$ 1,138	100%
Vehicular Products	$ 194,175	$ 16,343	8%	$ 16,343	100%
OAKLAND TOTALS	**$ 6,316,710**	**$ 2,693,339**	**43%**	**$ 2,759,206**	**98%**
Construction Products	$ 610,978	$ 472,351	77%	$ 598,077	79%
Landscaping Products	$ —	$ —	NA	$ —	NA
Non-Paper Office	$ 883,280	$ 408,862	46%	$ 783,743	52%
Paper Products	$ 2,598,425	$ 1,805,615	69%	$ 2,321,056	78%
Transportation Products	$ 30,916	$ 30,916	100%	$ 30,916	100%
Vehicular Products	$ 263,489	$ 9,549	4%	$ 72,917	13%
OAK RIDGE TOTALS	**$ 4,387,088**	**$ 2,727,293**	**62%**	**$ 3,806,709**	**72%**
Construction Products	$ 107,825	$ 75,195	70%	$ 75,195	100%
Landscaping Products	$ 341	$ 341	100%	$ 341	100%
Non-Paper Office	$ 254,228	$ 201,477	79%	$ 205,192	98%
Paper Products	$ 404,446	$ 341,264	84%	$ 381,609	89%
Transportation Products	$ —	$ —	NA	$ —	NA
Vehicular Products	$ 39,938	$ 4,557	11%	$ 10,762	42%
OHIO TOTALS	**$ 806,778**	**$ 622,834**	**77%**	**$ 673,099**	**93%**
Construction Products	$ 584,778	$ 53,515	9%	$ 65,675	81%
Landscaping Products	$ —	$ —	NA	$ —	NA
Non-Paper Office	$ 7,191	$ 2,374	33%	$ 2,374	100%
Paper Products	$ 16,808	$ 7,877	47%	$ 7,877	100%
Transportation Products	$ —	$ —	NA	$ —	NA
Vehicular Products	$ 27,981	$ 1,986	7%	$ 1,986	100%
POWER ADMINISTRATION TOTALS	**$ 636,758**	**$ 65,752**	**10%**	**$ 77,912**	**84%**

‡ Excludes the purchase of items for which a recycled product was not available at a competitive price or did not meet performance standards.

Table B-1 (Continued)
DOE Fiscal Year 1998
Affirmative Procurement
Purchases

Category	Total	With Recovered Content	Percent With Recovered Content	Adjusted Total ‡	Adjusted Percent With Recovered Content ‡
Construction Products	$ 73,037	$ 18,000	25%	$ 18,000	100%
Landscaping Products	$ —	$ —	NA	$ —	NA
Non-Paper Office	$ 648,504	$ 565,789	87%	$ 581,541	97%
Paper Products	$ 886,173	$ 819,256	92%	$ 871,457	94%
Transportation Products	$ —	$ —	NA	$ —	NA
Vehicular Products	$ 124,150	$ 41,686	34%	$ 41,686	100%
RICHLAND TOTALS	**$ 1,731,864**	**$ 1,444,731**	**83%**	**$ 1,512,684**	**96%**
Contruction Products	$ 41,912	$ 10,249	24%	$ 10,249	100%
Landscaping Products	$ —	$ —	NA	$ —	NA
Non-Paper Office	$ 194,827	$ 155,268	80%	$ 158,607	98%
Paper Products	$ 495,852	$ 453,702	91%	$ 463,495	98%
Transportation Products	$ 11,353	$ 11,353	100%	$ 11,353	100%
Vehicular Products	$ 8,023	$ 6,187	77%	$ 6,187	100%
ROCKY FLATS TOTALS	**$ 751,967**	**$ 636,759**	**85%**	**$ 649,891**	**98%**
Construction Products	$ 159,403	$ 126,710	79%	$ 126,710	100%
Landscaping Products	$ —	$ —	NA	$ —	NA
Non-Paper Office	$ 1,137,577	$ 916,682	81%	$ 916,682	100%
Paper Products	$ 2,527,786	$ 1,980,527	78%	$ 1,980,527	100%
Transportation Products	$ 7,040	$ —	0%	$ —	NA
Vehicular Products	$ 145,155	$ 55,370	38%	$ 55,370	100%
SAVANNAH RIVER TOTALS	**$ 3,976,961**	**$ 3,079,289**	**77%**	**$ 3,079,289**	**100%**
YUCCA MOUNTAIN TOTALS *	**$ 120,000**	**$ 120,000**	**100%**	**$ 120,000**	**100%**

* Yucca Mountain reported only Uncoated Printing and Writing Paper

‡ Excludes the purchase of items for which a recycled product was not available at a competitive price or did not meet performance standards.

Appendix C

Point of Contact List

This Appendix provides points of contact for obtaining additional information from DOE Operations/Field Offices and sites/facilities.

POINT OF CONTACT LIST

Operations/Field Office contacts are indicated in bold. Sites that did not report in Calendar Year 1998 are indicated in italics.

Operations Office	Site/Facility Name	Contact Name	E-Mail Address	Telephone	Fax
AL	**Albuquerque Operations Office**	**Mike Sweitzer** **Christina Houston**	**msweitzer@doeal.gov** **chouston@doeal.gov**	**505-845-4347** **505-845-5483**	**505-845-6286** **505-845-6286**
AL	Grand Junction Projects Office	Mary Ann Rondinella Andria Dutcher	mrondinella@doegjpo.com adutcher@doegjpo.com	970-248-6077 970-248-7656	970-248-6023 970-248-6040
AL	Inhalation Toxicology Laboratory	Steve Rohrer	srohrer@irri.org	505-845-1049	505-845-1238
AL	Kansas City Plant	Curtis Roth Bill Schlosberg	croth@kcp.com wschlosberg@kcp.com	816-997-5713 816-997-3673	816-997-7310 816-997-7313
AL	Los Alamos National Laboratory	Chris Murnane Dianne Wilburn	murnane@doeal.gov dwwilburn@lanl.gov	505-665-8774 505-667-6952	505-665-4504 505-665-8118
AL	Pantex Plant	Laura Pendlebury Jim Luginbyhl	lpendleb@pantex.doe.gov jluginb@pantex.com	806-477-3177 806-477-6507	806-477-6972 806-477-7979
AL	Sandia National Laboratories/CA	Carolyn Holloway Sally Raubfogel	cholloway@doeal.gov sjraubf@sandia.gov	505-845-5048 925-294-2341	505-845-4710 925-294-3418
AL	Sandia National Laboratories/NM	Carolyn Holloway Kylene Molley	cholloway@doeal.gov kjmolle@sandia.gov	505-845-5048 505-284-3982	505-845-4710 505-844-3747
AL	Waste Isolation Pilot Plant	Cindy Zvonar C.L. Woodin	zvonarc@wipp.carlsbad.nm.us woodinc@wipp.carlsbad.nm.us	505-234-7495 505-234-8505	505-234-7008 505-234-8854
CH	**Chicago Operations Office**	**Antanas Bindokas**	**antanas.bindokas@ch.doe.gov**	**630-252-2692**	**630-252-2654**
CH	Ames Laboratory	Dan Kayser	kayser@ameslab.gov	515-294-7923	515-294-2155
CH	Argonne National Laboratory – East	Frank Gines Keith Trychta	frank.gines@ch.doe.gov ktrychta@anl.gov	630-252-4182 630-252-1476	630-252-2361 630-252-3153
CH	Argonne National Laboratory – West	William Bass Adrian Collins	greg.bass@anlw.anl.gov adrian.collins@anlw.anl.gov	208-533-7184 208-533-7643	208-533-7422 208-533-7344
CH	Brookhaven National Laboratory	Caroline Polanish Glen Todzia	polanish@bnl.gov todzia@bnl.gov	516-344-5224 516-344-7488	516-344-3444 516-344-7334
CH	Environmental Measurements Laboratory	Al Crescenzi	alcres@eml.doe.gov	212-620-3571	212-620-3600
CH	Fermi National Accelerator Laboratory	Sally Arnold Rod Walton	sally.arnold@ch.doe.gov rwalton@fnal.gov	630-840-2239 630-840-2565	630-840-3285 630-840-3390

POINT OF CONTACT LIST

Operations/Field Office contacts are indicated in bold. Sites that did not report in Calendar Year 1998 are indicated in italics.

Operations Office	Site/Facility Name	Contact Name	E-Mail Address	Telephone	Fax
CH	New Brunswick Laboratory	Eric Dallmann	eric.dallmann@ch.doe.gov	630-252-3340	630-252-6256
CH	Princeton Plasma Physics Laboratory	Jeffrey Makiel Scott Larson Tom McGeachen	jmakiel@pppl.gov slarson@pppl.gov tmcgeach@pppl.gov	609-243-3721 609-243-3387 609-243-2948	609-243-2032 609-243-3366 609-243-3366
HQ	*Albany Research Center*	*Bert Staples*	*staples@alrc.doe.gov*	*541-967-5871*	*541-967-5936*
HQ	Bonneville Power Administration	James Meyer	jrmeyer@bpa.gov	503-230-5038	503-230-7591
HQ	Federal Energy Technology Center (FETC) - Morgantown	Jason M. Cook	jcook@metz.doe.gov	304-285-4718	304-285-4403
HQ	Federal Energy Technology Center (FETC) - Pittsburgh	Bruce Webster	webster@fetc.doe.gov	412-386-4475	412-386-4726
HQ	*National Petroleum Technology Office*	*David Alleman*	*dalleman@npto.doe.gov*	*918-337-4455*	*918-337-4418*
HQ	*National Renewable Energy Laboratory*	*Deborah Turner*	*deborah_turner@nrel.gov*	*303-275-4746*	*303-275-4788*
HQ	*Naval Petroleum & Oil Shale Reserves (CO, UT, WY)*	*David Miles*	*dam@casper.net*	*307-437-9631*	*307-437-9623*
HQ	**Office of Pollution Prevention, EM-77**	**J. Kent Hancock** **Gregory T. McBrien**	**kent.hancock@em.doe.gov** **gregory.mcbrien@em.doe.gov**	**301-903-1380** **301-903-1385**	**301-903-1398** **301-903-1398**
HQ	Southeastern Power Administration	Herbert Nadler	herbn@sepa.fed.us	706-213-3853	706-213-3884
HQ	Southwestern Power Administration	Joe Malinovsky Bob Orr	malinovsky@swpa.gov orr@swpa.gov	918-595-6667 417-891-2668	918-595-6656 417-891-2693
HQ	Strategic Petroleum Reserve Project Management Office (SPRPMO)	David Brine Mike Huff	david.brine@spr.doe.gov michael.huff@spr.doe.gov	504-734-4277 504-734-4816	504-734-4947 504-734-4070
HQ	Western Area Power Administration	Gene Iley	iley@wapa.gov	970-490-7294	970-490-7579
HQ	Yucca Mountain Site Characterization Office	Scott Wade Kent Wirtz	Scott_Wade@ymp.gov Kent_Wirtz@ymp.gov	702-794-5459 702-295-4980	702-794-5467 702-295-5223
ID	**Idaho Operations Office**	**Charles Ljungberg**	**ljungbc@id.doe.gov**	**208-526-0198**	**208-526-0553**
ID	Idaho National Engineering & Environmental Laboratory	Charles Ljungberg Glade Gilchrist Dave Janke	ljungbc@id.doe.gov ggg@inel.gov jankedh@inel.gov	208-526-0198 208-526-5769 208-526-6327	208-526-0553 208-526-5848 208-526-5514

POINT OF CONTACT LIST

Operations/Field Office contacts are indicated in bold. Sites that did not report in Calendar Year 1998 are indicated in italics.

Operations Office	Site/Facility Name	Contact Name	E-Mail Address	Telephone	Fax
NV	**Nevada Operations Office**	**Carol Shelton**	**shelton@nv.doe.gov**	**702-295-0286**	**701-295-1153**
NV	Nevada Test Site/North Las Vegas Facility	Carol Shelton Gina Cook	shelton@nv.doe.gov cookgm@nv.doe.gov	702-295-0286 702-295-2985	701-295-1153 702-295-1420
OAK	**Oakland Operations Office**	**Karin King**	**karin.king@oak.doe.gov**	**510-637-1638**	**510-637-1646**
OAK	Energy Technology Engineering Center	Karin King Satish Shah	karin.king@oak.doe.gov satish.n.shah@boeing.com	510-637-1638 818-586-5007	510-637-1646 818-586-5169
OAK	Lawrence Berkeley National Laboratory	Karin King Brian Smith	karin.king@oak.doe.gov bmsmith@lbl.gov	510-637-1638 510-486-6508	510-637-1646 510-486-6603
OAK	Lawrence Livermore National Laboratory	Karin King Sabre Coleman	karin.king@oak.doe.gov coleman2@llnl.gov	510-637-1638 925-422-3430	510-637-1646 925-422-4038
OAK	Stanford Linear Accelerator Center	Karin King Richard Cellamare	karin.king@oak.doe.gov rcellamare@slac.stanford.edu	510-637-1638 650-926-3401	510-637-1646 650-926-3306
OH	**Ohio Field Office**	**Doug Maynor**	**doug.maynor@ohio.doe.gov**	**937-865-3986**	**937-865-4402**
OH	Battelle Columbus Laboratories	Thomas Baillieul Steve Schmucker	thomas.baillieul@ohio.doe.gov schmucks@battelle.org	614-760-7372 614-424-3314	614-718-3190 614-424-7773
OH	Fernald Environmental Management Project	Shannon Kaster Alisa Rhodes	shannon.kaster@ohio.doe.gov alisa_rhodes@fernald.gov	513-648-3157 513-648-4968	513-648-3077 513-648-5527
OH	Mound Plant	Rob Rothman Carol Anderson	robert.rothman@ohio.doe.gov andecr@ohio.doe.gov	937-865-3823 937-865-4617	937-865-4489 937-865-4380
OH	RMI Environmental Services	Joe Britcher	joe_britcher@rmies.com	440-993-1976	440-993-1918
OH	West Valley Demonstration Project	Ahmad Al-Daouk Cathy Atkinson	aaldaouk@wv.doe.gov atkinsc@wv.doe.gov	716-942-4629 716-942-4503	716-942-2114 716-942-2110
OR	**Oak Ridge Operations Office**	**Ana Gonzalez**	**gonzalezal@oro.doe.gov**	**423-241-4212**	**423-576-6074**
OR	East Tennessee Technology Park	Ana Gonzalez Courtney Manrod Lori Manis	gonzalezal@oro.doe.gov pce@bechteljacobs.org lmanis@dpra.com	423-241-4212 423-576-0146 423-482-0400	423-576-6074 423-576-5971 423-482-7690
OR	Oak Ridge Institute for Science and Education	Ana Gonzalez Greg Mills Tom Wantland	gonzalezal@oro.doe.gov millsga@ornl.gov wantlant@orau.gov	423-241-4212 423-576-3714 423-576-3336	423-576-6074 423-576-3643 423-576-7047
OR	Oak Ridge National Laboratory	Ana Gonzalez Susan R. C. Michaud	gonzalezal@oro.doe.gov SUN@ornl.gov	423-241-4212 423-576-1562	423-576-6074 423-241-2843

POINT OF CONTACT LIST

Operations/Field Office contacts are indicated in bold. Sites that did not report in Calendar Year 1998 are indicated in italics.

Operations Office	Site/Facility Name	Contact Name	E-Mail Address	Telephone	Fax
OR	Oak Ridge Y-12 Plant	Ana Gonzalez	gonzalezal@oro.doe.gov	423-241-4212	423-576-6074
		Richard Martin	martinrw@oro.doe.gov	423-576-9428	423-576-0746
		Sheila Poligone	ss9@ornl.gov	423-241-2568	423-574-6934
OR	Office of Scientific and Technical Information	Ana Gonzalez	gonzalezal@oro.doe.gov	423-241-4212	423-576-6074
		Bill Edmonds	Bill.Edmonds@ccmail.osti.gov	423-576-3382	423-576-2865
OR	Paducah Gaseous Diffusion Plant	Ana Gonzalez	gonzalezal@oro.doe.gov	423-241-4212	423-576-6074
		W. David Tidwell	tidwellwd@ornl.gov	502-441-6807	502-441-6801
		Brian A. Bowers	babowers@lan-fl.com	502-441-5057	502-441-5222
OR	Portsmouth Gaseous Diffusion Plant	Ana Gonzalez	gonzalezal@oro.doe.gov	423-241-4212	423-576-6074
		Dewintus Perkins	qpk@ornl.gov	740-897-5524	740-897-3572
		John R. Venneman	V87@ornl.gov	740-897-2331/x5718	740-897-2900
OR	Thomas Jefferson National Accelerator Facility	Ana Gonzalez	gonzalezal@oro.doe.gov	423-241-4212	423-576-6074
		Barbara Morgan	bmorgan@jlab.org	757-269-7139	757-269-7146
		Linda Even	lle@jlab.org	757-269-7308	757-269-7559
OR	Weldon Spring Site Remedial Action Project	Ana Gonzalez	gonzalezal@oro.doe.gov	423-241-4212	423-576-6074
		Tom Pauling	tom_pauling@wssrap-host.wssrap.com	314-441-8978	314-447-0803
		Gwenan Skoba	gwenan_attwell@wssrap-host.wssrap.com	314-441-8086/x3133	314-447-1122
RF	**Rocky Flats Field Office**	**Dave Maxwell**	**dave.maxwell@rfets.gov**	**303-966-4017**	**303-966-4728**
RF	Rocky Flats Environmental Technology Site	Dave Maxwell	dave.maxwell@rfets.gov	303-966-4017	303-966-4728
		Tamar Krantz	tamar.krantz@rfets.gov	303-966-4374	303-966-3578
RL	**Richland Operations Office**	**Anna Beard**	**anna_v_beard@rl.gov**	**509-376-7472**	**509-372-1926**
RL	Hanford Site	Anna Beard	anna_v_beard@rl.gov	509-376-7472	509-372-1926
		Pete Segall	Peter_Segall@rl.gov	509-372-0469	509-373-0743
RL	Pacific Northwest National Laboratory	Anna Beard	anna_v_beard@rl.gov	509-376-7472	509-372-1926
		Eric Alderson	eric.alderson@pnl.gov	509-373-4233	509-366-8821
SR	**Savannah River Operations Office**	**Edwin Korzun**	**edwin.korzun@srs.gov**	**803-725-1589**	**803-725-3616**
SR	Savannah River Site	Phil Mottel	phil.mottel@srs.gov	803-557-6363	803-557-6526

Appendix D

Pollution Prevention Web Site Addresses

As recognition of the importance of pollution prevention increases, the number of pollution prevention Web sites also increases. Following is a growing list of Web site addresses for additional information on pollution prevention.

Center for Economic Studies: Energy and Environmental Issues

www.census.gov/cecon/www/ces.html

Defense Programs DP-45 Pollution Prevention Group

http://www.dp.doe.gov/dp45/p2

Department of Energy Home Page

www.doe.gov

DOE Complex-Wide Material Exchange

http://wastenot.er.doe.gov/DOEmatex

EcoMall

www.ecomall.com/

EcoNet

www.igc.apc.org/econet/

Environmental Compliance Assistance Center

www.hazmat.frcc.cccoes.edu

Environmental News Network

www.enn.com

Environmental Protection Agency Home Page

www.epa.gov

Environmental RouteNet

moe.csa.com/routenet

Environmental Management Program Integration

http://www.em.doe.gov/progint/

Enviroene

es.epa.gov

EPIC

epic.er.doe.gov/epic

Executive Order 13101 "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition"

http://gerweb.bdm.com/cfdocs/aprs/default.htm

Executive Orders

http://www.abm.rda.hq.navy.mil/chart.html

Fedworld

www.fedworld.gov

Global Futures Foundation

www.globalff.org/

The Global Network of Environment and Technology

gnet.together.org/

Idaho National Engineering and Environmental Laboratory Home Page

www.inel.gov/

The International Council for Local Environmental Initiatives

www.iclei.org./

Lawrence Berkeley National Laboratories Home Page

http://www-ehs.lbl.gov/wastemin/home.html

Lawrence Livermore National Laboratories Home Page

www.llnl.gov/

Maine Department of Environmental Protection's Pollution Prevention Resource List

www.state.me.us/dep/p2list.htm

Michigan Department of Environmental Quality

www.deq.state.mi.us

National Center of Excellence for Metals Recycle

http://www.oakridge.doe.gov/astutl/metals/

National Environmental Training Office

http://www.em.doe.gov/neto/

National Pollution Prevention Center for Higher Education

www.snre.umich.edu/nppc/

Oakland Office Waste Paper Reduction

http://eetd.lbl.gov/paper

Office of the Federal Environmental Executive

www.ofee.gov/

Office of Industrial Technologies Chemical Industry Team

www.oit.doe.gov/IOF/chemicals/

Office of Pollution Prevention (EM-77)

http://www.em.doe.gov/wastemin
(select EM-77 Web site)

http://twilight.saic.com/wastemin/

Office of Pollution Prevention and Compliance Assistance

www.dep.state.pa.us/dep/deputate/pollprev/pollution_prevention.html

Pacific Northwest National Laboratory's "Picture This"

http://PictureThis.pnl.gov./

Pollution Prevention Conference

http://p2.sandia.gov/

Pollution Prevention Program Office, Los Alamos National Laboratory

emeso.lanl.gov

SAGE Solvent Alernatives Guide

clean.rti.org

US Army Environmental Center

aec.army.mil/

Appendix E

Methodology for Calculating Pollution Prevention Project Return-on-Investment

A rigorous process for determining the Return-on-Investment (ROI) was established for the ROI Program that was initiated by the Pollution Prevention Executive Board. The process serves as a means to identify pollution prevention projects that provide a high ROI through the reduction of waste and its associated waste management costs, and therefore are fiscally beneficial to the Department. ROI is a performance indicator that compares savings for a particular project to the costs associated with that project.

ROI is defined as: Savings/Costs.

For the purposes of pollution prevention projects, ROI is calculated as follows:

$$ROI\% = \frac{[B - A] - \{[C + E + D]/ L\}}{[C + E + D]} \times 100$$

Where:

- A = Annual recurring operating and maintenance costs <u>After</u> implementation of project.
- B = Annual recurring operating and maintenance costs <u>Before</u> implementation of project.
- C = Capital Investment (one-time implementation cost).
- D = Estimated project termination/disassembly cost (only for projects with a useful life (L) greater than five years).
- E = Installation Operating Expenses (one-time implementation cost).
- L = Useful project Life (in years).

Standardized worksheets are utilized to identify and tabulate estimates for both annual recurring costs and implementation costs for a particular project. Example worksheets are provided on the following pages. Worksheet 1: Itemized Operating & Maintenance Annual Recurring Costs, facilitates the tabulation of the current (i.e., before or baseline) costs and anticipated future (i.e., after) costs following successful completion of the project. The costs associated with individual operating and maintenance categories are itemized on this worksheet. Worksheet 2: Itemized Project Funding Requirements, provides a cost breakdown of the project, identifying project funding requirements. The cost elements for both capital investments and installation operating expenses are listed as fully burdened costs to the Department.

E.1 Elements of ROI Equation Cost Components

E.1.1 Annual Recurring O&M Costs, Before & After (B & A)

Include <u>all</u> annual recurring costs associated with equipment, raw materials and supplies, utility costs (i.e., steam, electricity, natural gas, water, etc.), operation and maintenance

Worksheet 1: Itemized Operating & Maintenance Annual Recurring Costs

Expense Cost Items	Before Annual Costs		After Annual Costs
1. Equipment			
2. Purchased raw materials and supplies			
3. Process Operation Costs:			
Utility costs			
Labor costs			
Routine maintenance costs for processes			
4. PPE & related health/safety supply costs			
5. Waste Management Costs:			
Waste container costs			
Treatment/Storage/Disposal costs			
Inspection/Compliance costs			
6. Recycling Costs			
Material collection/separation/preparation costs			
a. Material and supply costs			
b. Operations and maintenance labor costs			
Vendor costs for recycling			
7. Administrative/Other Costs			
Total Annual Cost : Before (B) =		**After (A) =**	

Worksheet 2: Itemized Project Funding Requirements (i.e., One Time Implementation Costs)

Category	Cost $
Initial Capital Investment **GPE:** ☐ **GPP:** ☐ (mark, as applicable)	
1. Design	
2. Purchase	
3. Installation	
4. Other capital investments (explain)	
Subtotal: Capital Investment = (C)	
Installation Operating Expenses	
1. Planning/ Procedure development	
2. Training	
3. Miscellaneous supplies	
4. Startup/Testing	
5. Readiness reviews/ Management assessment/ Administrative costs	
6. Other installation operating expenses (explain)	
Subtotal: Installation Operating Expenses = (E)	
TOTAL PROJECT FUNDING REQUIREMENTS = (C + E)	

Useful Project Life = (L) _____ Years **Time to Implement: _____ Months**

Estimated Project Termination/Disassembly Cost (if applicable) = (D) _____
(Only for Projects where L ≤ 5 years; D = 0 if L > 5 years)

Return on Investment Calculation

$$\text{Return on Investment (ROI) \%} = \frac{\text{[Before - After] - \{[Total Project Funding Requirements + Project Termination] / Useful Life\}}}{\text{[Total Project Funding Requirements + Project Termination]}} \times 100$$

$$\text{ROI \%} = \frac{[\,B - A\,] - \{\,[\,C + E + D\,] / L\,\}}{[\,C + E + D\,]} \times 100 = \_\_\_\_\_ \%$$

Notes: Before (B) and After (A) are Operating & Maintenance Annual Recurring Costs from Worksheet 1.

labor costs (fully burdened, including overheads and indirects), protective equipment and other related health or safety materials and supplies, waste containers, waste Treatment/Storage/Disposal, inspection/compliance (sampling, testing, laboratory analysis), material collection/separation/preparation for recycle, and administrative costs (record keeping, data analysis, progress reporting).

Labor costs are determined for a particular activity by multiplying the estimated annual man-hours by the appropriate labor rate, in dollars per hour, paid to personnel who will be either operating the equipment in question or, as appropriate, supervising its operation. Overhead rates and indirects should be added in as appropriate.

Credit for labor savings can only be taken when a person is removed from the particular process group (or plant charge number) or stops charging his/her hours to the subject account.

E.1.2 Initial Capital Investment (C)

Include all one-time expenditures associated with design, procurement, installation of the project.

E.1.3 Project Termination / Disassembly Cost (D)

Include costs associated with disassembly and removal of equipment/structures provided as part of the proposed project, decontamination, release surveys, and final dispositioning of materials.

E.1.4 Installation Operating Expenses (E)

Include all one-time expenditures (material and labor) associated with planning/ procedure development, training, miscellaneous supplies, startup and testing, readiness reviews, and management assessment, and any other expense costs required to implement the project.

Appendix F

Glossary of Terms

11e(2) BYPRODUCT MATERIAL - As defined by Section 11e(2) of the Atomic Energy Act of 1954, as amended, and Department of Energy Order 5820.2A, 11e(2) byproduct material is "the tailings or waste produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content." Ore bodies depleted by uranium solution extraction operations and which remain underground do not constitute byproduct material.

AFFIRMATIVE PROCUREMENT - The Resource Conservation and Recovery Act, Section 6002, requires Federal agencies to purchase items designated by the Environmental Protection Agency (EPA) as having recycled or recovered content. President Clinton's Executive Order 13101, *Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition*, requires all federal agencies to increase their effort in waste prevention, recycling, and the purchase of environmentally preferable products. Executive Order 13101 supersedes Executive Order 12873, *Federal Acquisition, Recycling and Waste Prevention*, and requires federal agencies to set goals for solid waste prevention and recycling for the years 2000, 2005, and 2010. Federal agencies should also incorporate the recycle/reuse of pallets and the collection of toner cartridges for remanufacturing into their recycling programs, set goals to increase the procurement of products made with recovered materials, and increase the use of environmentally preferable products and services. In May 1996, the Secretary of Energy set a goal increasing the Department of Energy's procurement of EPA-designated items to 100 percent by December 31, 1999.

CALENDAR YEAR - The twelve-month period based on the Gregorian calendar, beginning January 1 and ending December 31.

CLASS I OZONE-DEPLETING SUBSTANCES - Chlorofluorocarbons, halons, carbon tetrachloride, and methylchloroform which cause or contribute significantly to harmful effects on the stratospheric ozone layer.

CLEANUP/STABILIZATION WASTE - Cleanup/stabilization encompasses a complex range of activities including environmental restoration of contaminated media (soil, groundwater, surface water, sediments, etc.); stabilization of nuclear and nonnuclear (chemical) materials; and deactivation and decommissioning (including decontamination) of facilities. Cleanup/stabilization waste consists of one-time operations waste produced by environmental restoration program activities, including primary and secondary wastes associated with retrieval and remediation operations; "legacy wastes;" and wastes from decontamination and decommissioning/transition operations. It also includes all Toxic Substances Control Act regulated wastes, such as polychlorinated biphenyl-contaminated fluids and/or equipment. Note that cleanup/stabilization activities that generate wastes do not necessarily occur at a single point in time, but may have a duration of several years during which time wastes are produced.

By definition, these activities are not considered to be routine (periodic and/or on-going), because *the waste is a direct result of past operations and activities*, rather than a current process. Newly generated wastes that are produced during these "one-time operations" are considered to be a secondary wastestream, and are separately accounted for whenever possible. This secondary (newly generated) waste usually results from common activities such as handling, sampling, treatment, repackaging, shipping, etc.

Example: Twenty drums of unknown waste are retrieved from an old dump site. The waste must be sampled and characterized before any treatment or disposal options can be determined. What kinds of waste are generated by this particular activity?

Primary Waste: the original 20 drums of waste (including the drums) which were retrieved. The 20 drums of waste were generated by past operations, and are not considered newly generated wastes.

Secondary Waste: any newly generated waste which results from the retrieval, sampling, or characterization process (e.g., anti-contamination clothing, sample vials, syringes, chemicals, containers, contamination control structures, etc.).

DEACTIVATION AND DECOMMISSIONING (D&D) - Actions taken to reduce the potential health and safety impacts of contaminated DOE facilities, including activities to remove a facility from operation, followed by decontamination, entombment, dismantlement, or conversion to another use.

DOE AREA OFFICES - The first line DOE field element that carries the organizational responsibility for (1) managing and executing assigned programs, (2) directing contractors who conduct programs, and (3) assuring that environment, safety, and health protection are integral parts of each program.

DOE FIELD OFFICES - The first line DOE field element that carries the organizational responsibility for (1) managing and executing assigned programs, (2) directing contractors who conduct programs, and (3) assuring that environment, safety, and health protection are integral parts of each program.

DOE OPERATIONS OFFICES - In the absence of a DOE Area Office, the first line DOE field element that carries the organizational responsibility for (1) managing and executing assigned programs, (2) directing contractors who conduct programs, and (3) assuring that environment, safety, and health protection are integral parts of each program.

FISCAL YEAR - For DOE, the twelve-month period used for accounting purposes, beginning October 1 and ending September 30.

HAZARDOUS WASTE - A solid waste, or combination of wastes, that because of its quantity, concentration, or physical, chemical, or infectious characteristics, may (a) cause or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness, or (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored,

transported, or disposed of, or otherwise managed. Hazardous waste is further defined in this report as:

Resource Conservation and Recovery Act (RCRA) regulated - solid waste, not specifically excluded from regulation under 40 CFR 261.4, or delisted by petition, that is either a listed hazardous waste (40 CFR 261.30 - 261.33) or exhibits the characteristics of a hazardous waste (40 CFR 261.20 - 261.24).

State regulated - any other waste not specifically regulated under RCRA, which may be regulated by State or local authorities, such as used oil.

Toxic Substances Control Act (TSCA) regulated - Individual chemical wastes (both liquid and solid), such as polychlorinated biphenyls, which are regulated by the Toxic Substances Control Act.

HIGH-LEVEL RADIOACTIVE WASTE - Irradiated reactor fuel, liquid wastes resulting from operation of the first cycle solvent extraction system or equivalent, and the concentrated wastes from subsequent extraction cycles or equivalent in a facility for reprocessing irradiated reactor fuel, and solids into which such liquid wastes have been converted (10 CFR 60.2).

LIFE-CYCLE ASSET MANAGEMENT - A DOE policy required by DOE Order 430.1 for the treatment of Departmental land and facilities as valuable national resources; and the planning, acquisition, operation, maintenance, and disposal of land and facilities in a cost-effective manner.

LOW-LEVEL RADIOACTIVE WASTE - Radioactive waste not classified as high-level waste, transuranic waste, spent nuclear fuel, or byproduct material (specified as uranium or thorium tailings and waste in accordance with DOE Order 5820.2A).

MIXED WASTE - Waste that contains both radioactive and hazardous components, as defined by the Atomic Energy Act, Toxic Substances Control Act, or Resource Conservation and Recovery Act. Mixed waste is further defined here as low-level mixed, and Toxic Substances Control Act mixed.

POLLUTION PREVENTION - Preventing or reducing the generation of pollutants, contaminants, hazardous substances, or wastes at the source, or reducing the amount for treatment, storage, and disposal through recycling.

Waste minimization/pollution prevention can be applied to all pollution-generating activities at DOE, including:

- Manufacturing and production operations
- Weapons dismantlement
- Maintenance
- General operations
- Transportation
- Research, development, and demonstration
- Laboratory research

- Decommissioning activities
- Legacy waste and contaminated site cleanup

Waste minimization/pollution prevention can be achieved through:

- Source Reduction - equipment or technology selection or modification, process, or procedure modification; reformulation or redesign of products; substitution of raw materials; and improvements in housekeeping, maintenance, training, or inventory control. Increased efficiency in the use of raw materials, energy, water, or other resources, including affirmative procurement. Protection of natural resources by conservation.
- Segregation - the practice of separating or isolating contaminated materials from non-contaminated materials; or the separation/isolation of one waste type from another in an attempt to minimize the amount of the more noxious (and costly) material for disposal.
- Recycle/Reuse - the use, reuse, or reclamation of waste materials.

Environmental restoration activities are directed toward removal and treatment of legacy waste and pollutants already generated by past production and manufacturing operations. In the process of conducting restoration activities, additional waste and pollutants may be generated (e.g., decommissioning of a plant and equipment; dismantlement of weapons systems). Waste minimization/pollution prevention techniques should be employed during these activities to prevent or reduce the generation of new wastes and pollutants.

POLLUTION PREVENTION OPPORTUNITY ASSESSMENT (PPOA) - Appraisal of a process, activity, or operation as a way of identifying and evaluating potential waste minimization opportunities.

PRIMARY WASTE - See Cleanup/Stabilization Waste definition.

PROGRAMMATIC ACTIVITIES - Designation used for reporting pollution prevention activities that do not result in directly quantifiable waste reductions and cost savings. Examples of these activities include training, outreach, public awareness, research and development, conduct of pollution prevention opportunity assessments, infrastructure development, and recognition awards. This designation is also used to capture any activity that provides a cost savings with no measurable waste reduction.

PROGRAM SECRETARIAL OFFICE (PSO) - An office within DOE, headed by an Assistant Secretary or Organizational Director, that reports and has management responsibility over designated multi-program Operations Offices and National Laboratories. These offices include Defense Programs (DP), Energy Efficiency and Renewable Energy (EE), Environmental Management (EM), Office of Scientific and Technical Information (ET), Office of Fossil Energy (FE), Human Resources and Administration (HR), Nuclear Energy (NE), Office of Civilian Radioactive Waste Management (RW), and Office of Science (SC).

RCRA REGULATED WASTE - See Hazardous Waste definition.

RECYCLING/REUSE - See Pollution Prevention definition.

REPORTING SITE - A specific DOE site that meets the minimum threshold reporting requirement for providing data for the *Annual Report of Waste Generation and Pollution Prevention Progress*.

RETURN-ON-INVESTMENT (ROI) POLLUTION PREVENTION PROJECTS - Specific pollution prevention projects that rapidly pay for themselves (preferably in three years or fewer) through reducing future pollutant generation.

ROUTINE OPERATIONS WASTE - Normal operations waste produced by any type of production, analytical, and/or research and development laboratory operations; treatment, storage, or disposal operations; "work-for-others;" or any other periodic and recurring work that is considered ongoing. The term "normal operations" refers to the type of ongoing process (e.g., production) *not* to the specific activity that produced the waste. Periodic laboratory or facility clean-outs and spill cleanups which occur as a result of these processes are also considered normal operations.

SANITARY WASTE - Wastes, such as garbage, that are generated by normal housekeeping activities and are not hazardous or radioactive. Process wastewater is not included in the scope of this Report.

SECONDARY WASTE - See Cleanup/Stabilization Waste definition.

SEGREGATION - See Pollution Prevention definition.

SITE - A geographic entity comprising land, installations, and/or facilities required to perform program objectives for which DOE has (or shares) responsibility for environmental restoration or waste management activities. A site generally has all of the required management functions within its organizational structure. Examples of sites include the Hanford Site, Savannah River Site, Brookhaven National Laboratory, Kansas City Plant, Pantex Plant, and the Oak Ridge Y-12 Plant.

SITE-WIDE POLLUTION PREVENTION PROGRAM ACCOMPLISHMENTS - Waste minimization accomplishments that affect the entire site, rather than just a single process or PSO-specific activity. Site-wide accomplishments include efforts directed at all employees at the reporting site, such as a narrative description of recycling programs (paper, aluminum cans, etc.).

SOURCE REDUCTION - See Pollution Prevention definition.

STORAGE - Holding radioactive, hazardous, or sanitary waste for a temporary period, at the end of which the waste is treated, disposed, or stored elsewhere.

TRANSURANIC WASTE - Waste that is contaminated with alpha-emitting radionuclides with an atomic number greater than 92 (heavier than uranium), half-lives greater than 20 years, and concentrations greater than 100 nanocuries per gram of waste.

TREATMENT - Any method, technique, or process, including neutralization, designed to change the physical, chemical, or biological character or composition of any radioactive, hazardous, or sanitary waste, so as to neutralize, recover energy or material resources from the waste; to render the waste nonhazardous, safer to transport, store, or dispose; to render the waste amenable for recovery or storage; or to reduce its volume.

WASTE GENERATION - Any waste produced during the current calendar year. Does not include waste produced in previous years that is being re-packaged, treated, or disposed in the current calendar year. Does include secondary waste generated by the treatment, storage, or disposal of previously generated wastes (e.g., clothing, gloves, waste from maintenance operations, etc.).

WASTE MINIMIZATION - An action that economically avoids or reduces the generation of waste by source reduction, reduces the toxicity of hazardous waste, improves energy usage, or recycling. This action will be consistent with the general goal of minimizing present and future threats to human health, safety, and the environment.

WASTESTREAM - A waste or group of wastes with similar physical form, radiological properties, Environmental Protection Agency waste codes, or associated Land Disposal Restriction treatment standards. The waste or group of wastes may be the result of one or more processes or operations.

WASTE TYPE - Definition of waste based on physical properties or characteristics (e.g., high-level, transuranic, low-level radioactive, low-level mixed, hazardous, or sanitary).

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